

MODERN PLASTICS

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• GENERAL INTEREST

Fish Story.....	23
Indirect Highway Lighting.....	28
Metal Inlays that Stay Put.....	30
Announcing Third Annual Modern Plastics Competition.....	32
Pre-focused Lamp in Molded Case.....	34
New Cameo Dispenser.....	40

• TECHNICAL SECTION

Natural Resins in Plastics.....	43
Molds for Phenol Resinoids (concluding installment).....	44
Permanence of Plastics.....	46
Plastics Digest.....	48
U. S. Plastics Patents.....	50

• NEWS AND FEATURES

Plastic Modes.....	36
Stock Molds.....	41
News.....	54
Equipment.....	58
Publications.....	60
British Industries Fair.....	62
In Review.....	64
Five Years Old.....	72



• NEXT MONTH

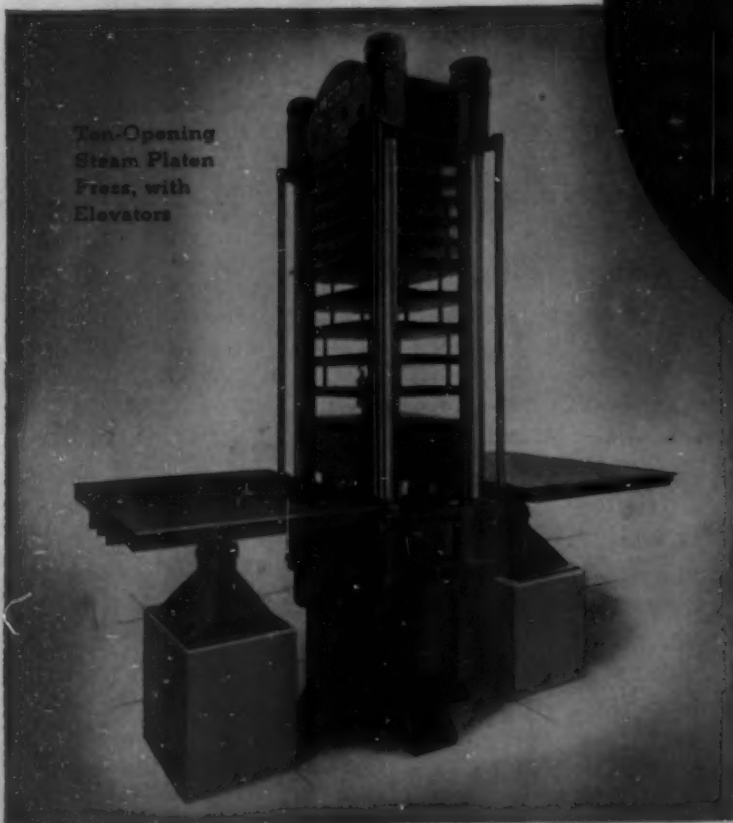
Some of the most attractive items we have seen turned out of cast resins are being designed and fabricated by youngsters averaging 17 years of age. Under the guidance of a national headquarters, Junior Achievement groups are organized in many cities and towns to create and sell their products in a most business-like way. The story of Junior Achievement and illustrations of the work being done in plastics will appear in our June issue.

MAY 1938 5

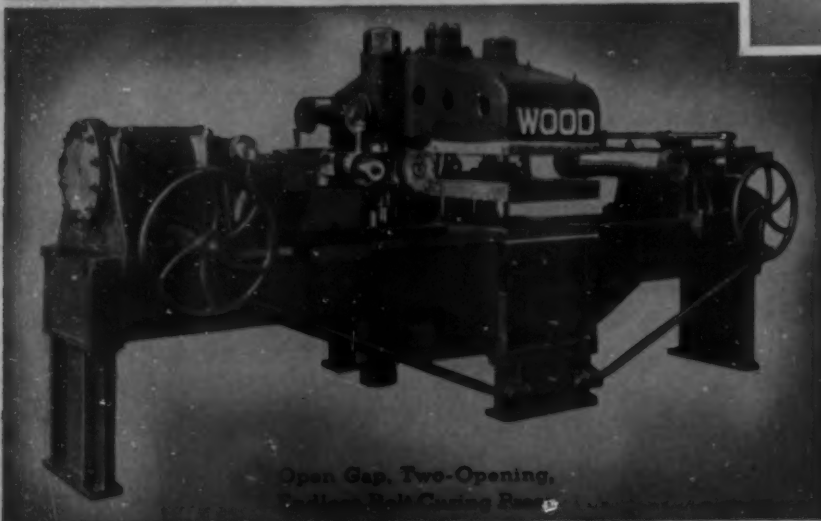
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FISH STORY

by EVE MAIN

PHOTO COURTESY CATALIN CORP.

ONE DAY A COUPLE OF YEARS AGO, GEORGE Beck went fishing off the coast of New Jersey, anchored between two groups of old-timers, dropped his line overboard and starting hauling in one fish after another with scarcely a pause between. His neighbors, who had been sitting for hours with only an occasional tug at their lines and a fish or two to show for it, watched and envied. Then curiosity got the better of them. They began pulling closer to see what this man had to offer that they didn't, and were treated to a glimpse of the working out of Mr. Beck's theory that fish are as fascinated by bright lights as any country lad or lassie walking up Broadway at night for the first time.

When he pulled in his line, they saw a gleam of light come bobbing up through the water followed by shadowy forms darting back and forth, gradually closing in. As it neared the surface one of the gray shapes, bolder than the others, grabbed for it, and in a flash was squirming helplessly on a cunningly placed hook attached to the light. In no time a plump bass was floundering around in the bottom of the boat and Mr.

Beck was proudly showing a skeptical audience the home-made lure that was causing all the excitement. It wasn't much to look at and had nothing at all in common with ordinary lures—except the hooks. Merely a discarded cellulose tooth-brush holder, fitted with hooks, housing a small flash-light battery and bulb. But the fish didn't seem to mind the crudeness of the bait. When the spot of light came dancing down to the feeding grounds, they gathered around, looked it over from all sides and then when it began moving up again, just naturally took a bite at it.

Now a never-fail lure is something all fishermen dream about and George Beck was no exception, patiently trying out new ones as they came along for day and night sport. "I had noticed," he says, "that at night there was usually a mad scramble on fishing piers to get directly under the arc lights. When lines were pulled up, I saw fish following up toward the surface, but they came only so far and then fell back without so much as a snap at the bait. It seemed to me that if a light were dropped down where the fish could get at it,



Left: Chloe Travis, captor of sailfish too small to enter in West Palm Beach Sailfish Derby, watches guide Bill DeWaal remove Catalin headed feather lure, wrapped in towel, after which the fish being unhurt was released. Right: Lighted Plastacele lure being removed from mouth of 53-pound amberjack landed by Andrew J. Eiseman off Stuart, Florida

they might be foolish enough to take a nibble." It was only a theory but it worked. With his first attempt at an illuminated lure, Mr. Beck could pick the poorest spot on the pier any night, throw out a line and pull in fish while other men stood around and waited for a bite.

It was all in fun at first, for the amusement of himself and his friends, but so many fishermen began asking where they could get similar lures that late in 1937 a company, with Beck as president, was organized to make them. Of course, the original lure had to be tested for correct material, shape and color. Mr. Beck had a pretty good idea of the characteristics of plastics because for twenty-two years he has been part owner of a tool and machine company creating designs for molds used in plastic production.

"I felt this was the ideal material to use," he says. "It could be had in translucent colors permitting the light to shine through, and would not be affected by salt or fresh water. The cellulose formula finally worked out in amber, moonglow, red, salmon and mottled pink certainly does the trick nicely."

The lighted lure is molded in two egg-shaped parts that screw clockwise together against a rubber washer making an air-tight and water-tight container for the small battery and bulb. As the parts are screwed together the bulb is brought into contact with the battery and the light flashes on. These little batteries last from three to four hours and then may be replaced. The swivel head and trim of the lure are chromium and the business-like hooks are interchangeable.

Testing the lure was a happy combination of pleasure and business, pleasure predominating. Mr. Beck and George Klauss, sales manager and secretary of the new company induced Captain Charles E. Van Note to take them on trial trips aboard his cabin cruiser, *Alida*. Captain Van Note, somewhat of an authority on fish and what it takes to catch them, was a bit doubtful about this newfangled notion of capturing fish with

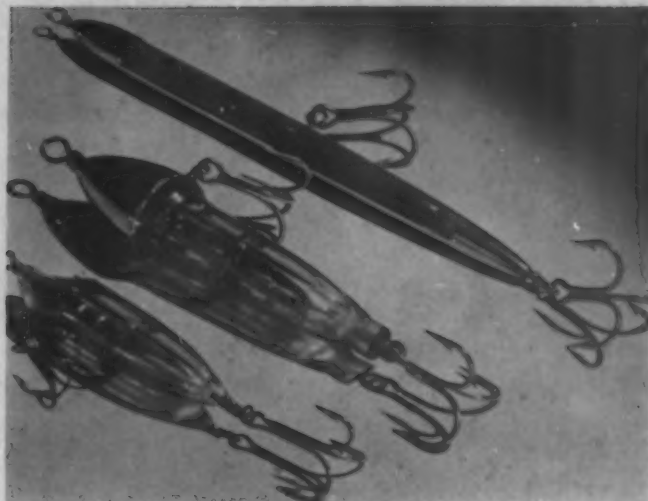
electric light. After the first trip, however, he was as enthusiastic as the others. Each Saturday afternoon the three men started off from Brielle, N. J., to try their luck. Each Sunday night they returned laden with tuna, bluefish and striped bass bursting with stories, not about the big ones that got away, but rather about the big ones they really landed.

The men didn't stop with the lighted lure. Once that was perfected to their satisfaction, leaving nothing to worry about except production, they worked out a second—this one unlighted. Within a rigid transparent cellulose body, they placed a shiny metallic spiral, scientifically balanced so that it vibrates rapidly at the slightest movement. Pulled along through the water, it looks every bit as tempting as live bait, but two sets of three-pronged hooks at the front and rear mean trouble for any fish bold enough to gobble it.

Sand eels, the favorite food of many different kinds of fish suggested the pattern for a third lure. Long and slender with gray and pearl mottled cellulose sides, chromium plated frame and two sets of hooks, it takes to the water like any sand eel, but this one bites back.

During their testing and experimenting, the three men discovered that fish change their eating habits occasionally even as you and I. Sometimes they hunt near the surface, sometimes at the bottom or any place between that looks promising. To be sure of having the bait in the right place at the right time, a trolling ballast was worked out which can be sunk to any depth while trolling at tuna or bluefish speed. The ballast is really a series of weighted sections and the depth is controlled by the number of weights used. It is attached to a separate line and the fish line passes through a sort of clip on the ballast. When a fish strikes, the fish line slips from the clip and the ballast drops out of the way while the catch is being landed.

Last January, Captain Van Note and George Klauss packed a supply of the lures and headed for Florida to



Top left: Brightly colored Lumarith lures from James Heddon's Sons Co. Top right: Gray and pearl mottled Eel lure and Vibro senior and junior lures with shiny, vibrating metallic spiral in a Plastacele shell—Sure Catch Lure Co. Below: Lur-O-Lite, illuminated Plastacele lure molded for Sure Catch Lure Co. by Boonton Molding Co.





INJECTION MOLDED TENITE FISH LURES

test them in southern waters. They distributed about two dozen lighted lures among more or less expert fishermen and came home with tales of handsome catches of amberjack, kingfish, barracuda, dolphin and sailfish—with mounted specimens for proof. They tell how during a cruise on the Florida and Caribbean waters, Mrs. Horace E. Dodge hauled in a 58-pound barracuda on one of the lures and the bait she used is pitted with teeth marks of the huge fish. One of its teeth broke off and is embedded in the plastic body of the lure. With similar bait, Andrew J. Eiseman landed a 53-pound amberjack off Stuart, Florida. Seven sailfish were reported caught in four hours using the lure as a teaser to entice the fish to the surface where a chunk of fresh bait on a separate line was dangled before them. Contrary to all precedent, the sailfish were soon biting the teaser and ignoring the bait.

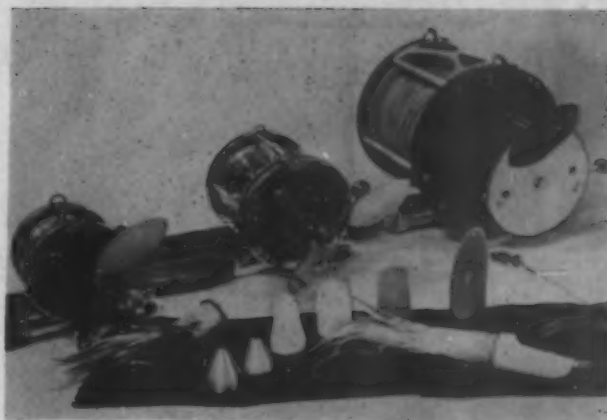
In the St. Lucie River, Stuart, Florida, fifteen different species of fish were caught in three and a half hours on one of the unlighted lures. One or two of these, so they say, have never before been known to show interest in anything but live bait.

Some of the mounted Florida fish were displayed at the Sportsman's Show held in February at the Grand Central Palace in New York where the lighted lure was publicly exhibited for the first time. The booth was crowded from the moment the show opened and attendants were kept busy explaining over and over again how the lure works and telling tales of big fish that will swim no more because of its attraction.

Tempting these denizens of the deep with synthetic bait is by no means a new thought. Three hundred years ago Izaak Walton's kit included an artificial minnow fashioned from green and white silk with fine quills for tail and fins and black beads for eyes, as well as imitation flies made of feathers and wool. Ever since his time, inventive minds have been busy plotting surer ways of snaring unsuspecting fish, until the production of lures, along with rods, reels and lines, has become a national industry of no small size. It is only within the last few years, however, that plastics have crept into the picture and modern fish seem to prefer this modern material if the yarns we hear are "all wool."

There's a combination lure with interchangeable cast resin heads and gaudy feather tail used by West Coast fishermen for several years. Brought to the East Coast for the first time by western competitors in this year's West Palm Beach Sailfish Derby, it apparently looked good to our eastern fish who went for it in a big way. Captain Bill DeWaal, expert fishing guide, aboard the good ship *Netop* supervised the landing of many a sailfish during the Derby, caught by the West Coast method of adding one of these brightly colored lures to a fresh mullet. Other species of fish nip and hang on to the lure without being served with other bait.

The action of the combination lure in the water is controlled by the shape of the plastic head which may be sliced diagonally, square with indentations, rounded, brought to a peak or otherwise carved. One shape makes the lure dive down into (*Please turn to page 74*)



Egg-shaped Catalin reel handles introduced at Miami by Lee's Tackle Shop, and Frank Hetzel's Combination lure with interchangeable Catalin heads

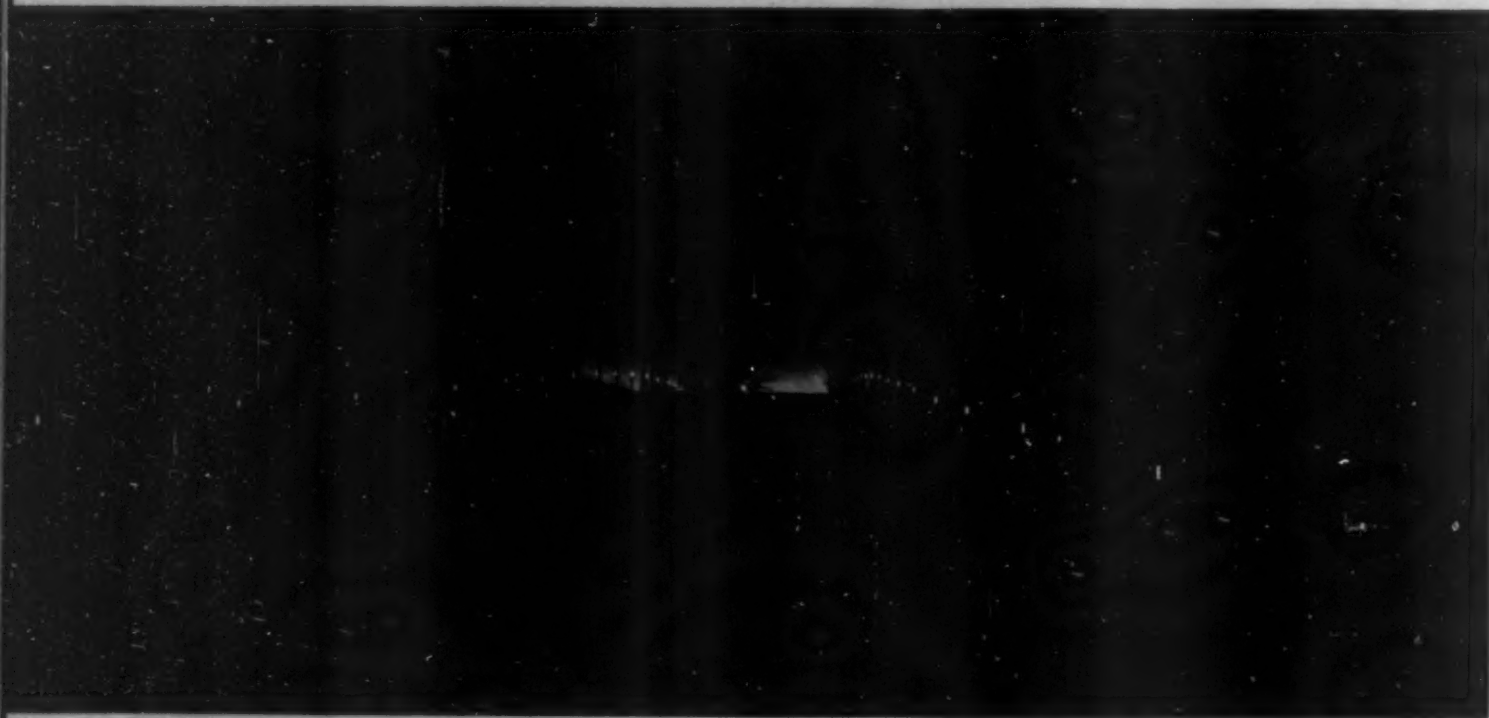


Bronson deep sea reel with ends molded from Tenite by Reynolds Spring Co. Below: Decorative reel seats injection molded of Tenite by Sobenite, Inc., for South Bend Co.

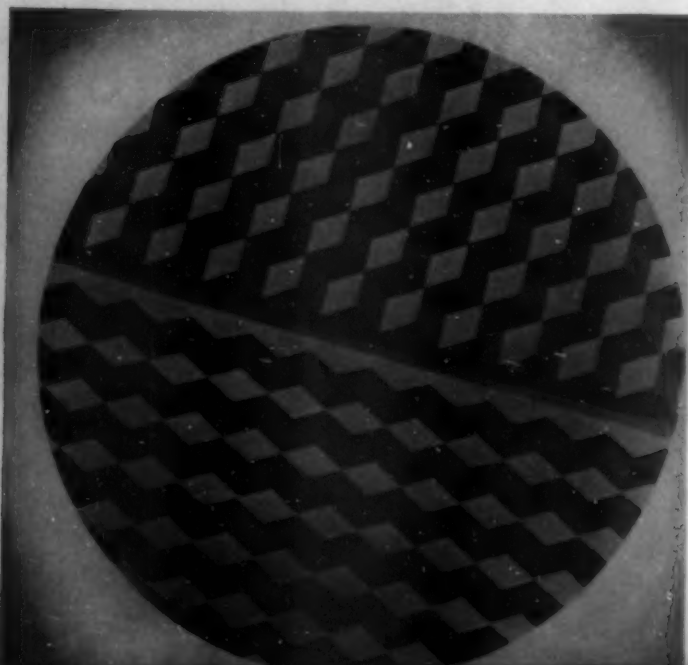


INDIRECT HIGHWAY LIGHTING

Important plastics development cuts maintenance costs of highway lighting and promotes safety



Unretouched photo taken on Route U. S.—16 between Detroit and Lansing, Mich., showing the night lighting effect of plastic reflectors installed every hundred feet except through towns. Close up of reflector unit (left) mounted on flexible post 8 feet from the highway edge. Below is an enlarged view of the retro-directive reflector showing prisms on the back. The reflector disks, trade-marked Stimsonite, are manufactured by the inventor, Jonathan Cass Stimson; metal parts and assembly by Signal Service Corp., which company made the traffic survey leading up to the installation and is sponsoring the entire plan. The plastic material is Lucite, a du Pont product



A NEW PLASTIC REFLECTOR PLAYS THE STELLAR role in a system of Indirect Highway Lighting which made its bow for public favor on April sixth. This wholly new type of highway illumination was installed on Federal highway number Sixteen between Detroit and Lansing, Michigan, following six months of trial and experiment with the system under carefully controlled service conditions at the General Motors Proving Ground at Milford, Michigan.

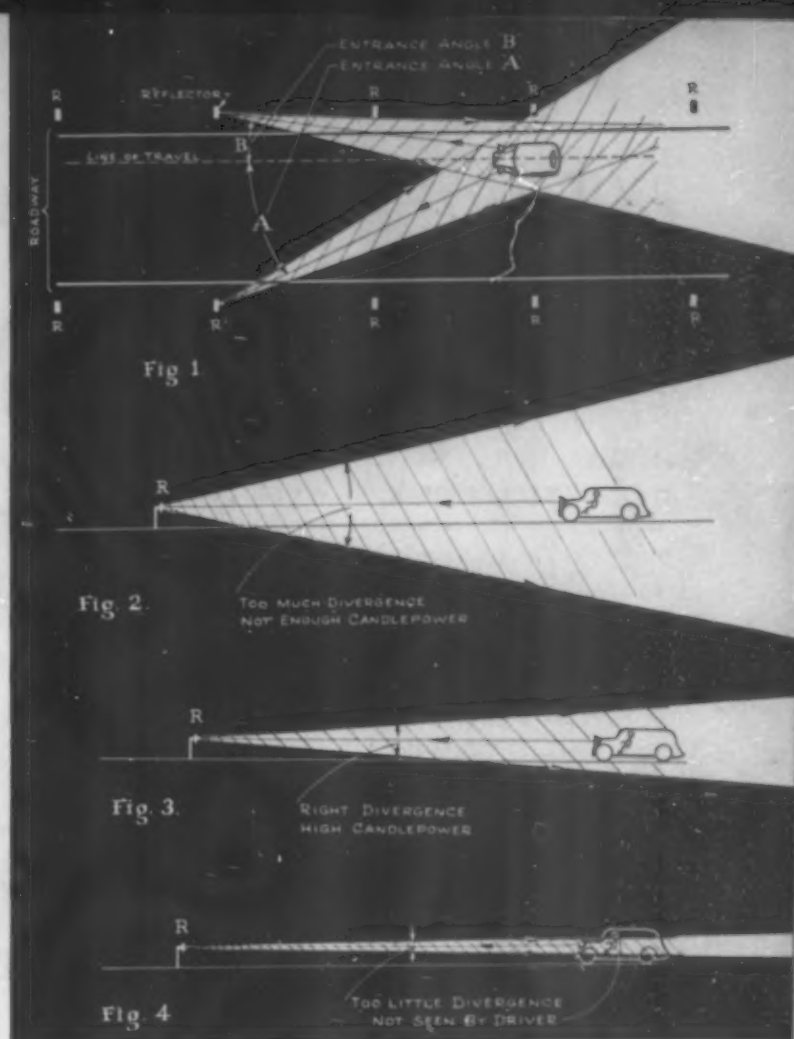
On the night of the opening, Michigan's Highway Commissioner, Murray D. Van Wagoner, was host to a group of over one hundred prominent highway, automotive, safety and traffic enforcement officials, who were conducted over the road at night in a caravan of forty automobiles. The installation was received enthusiastically by a number of speakers in a forum held after the inspection trip. These comments were probably best summed up by Thomas H. MacDonald, chief of the United States Bureau of Public Roads, who said: "This is a very definite contribution to the safety of the highways and the utility of roads at night. I look for the idea to spread like wildfire."

Indirect highway lighting comprises lines of light marking the outer edge of the shoulder of the highway, and is created by groups of powerful transparent plastic reflectors set at 100-foot intervals for the entire 90-mile stretch between Detroit and Lansing, except within city limits.

The reflectors are the invention and development of Jonathan Cass Stimson of Chicago, and are pressed from colorless transparent methyl methacrylate resin. Six reflector disks, one and five-eighths inches in diameter, are assembled in a pressed metal housing to form a double facing marker which is snap-locked to the top of a flexible angle iron post. The posts are located so that the reflectors are accurately aligned three feet above the pavement and eight feet from the pavement edge. The Michigan Highway Department erected the system with their regular construction crews, and the installation cost, including erection, totaled \$23,000, or about \$340 per mile of lighted roadway.

The motorist provides his own light in indirect highway lighting. Light from his headlights strikes the reflectors, and a large proportion of that light is returned as a narrow beam of brilliant illumination for the driver. The car, as it moves down the highway, is constantly changing its angular position with the reflectors; therefore, ordinary mirrors can not be used. A combination of mirrors or an optical system must be used which *automatically* returns the light back toward the moving car, *regardless* of the entrance angle of the light on the reflector. (See Fig. 1, A and B.) Such an optical system is called a retro-directive reflector. The more closely the returned light is confined around the headlights (Figs. 1, 2, 3, 4—shaded portions), the more brilliant does the reflector appear to the observer.

The retro-directive reflector is a large group of tiny cube corners, there being over three hundred cubes in each of the new indirect lighting disks. There are 624 disks per mile, therefore, over 187,000 accurately



made optical units per mile; or more than 12,000,000 between Detroit and Lansing on the newly lighted road. Each of the cube corners is a complete retro-directive optical system in itself. A light ray entering the front surface is reflected from surface to surface of the cube, and after the third reflection is automatically directed back toward the headlight, regardless of the entrance angle.

If the thousands of tiny cubes are made with only an average degree of accuracy, the light is reflected back toward the source all right, but is spilled throughout a widely diverging cone (See Fig. 2, divergence angle) and results in low candlepower seen by the driver, perhaps not bright enough to be seen more than 100 feet or so. But if the cubes are made with a very high degree of dimensional accuracy (approaching the extreme precision of scientific optical instruments such as microscopes), the reflected light is confined within a narrow divergence angle (Fig. 3) and results in very high candlepower seen by the driver; light enough to be seen for a mile or more and to throw back into the cab of the motor car so much light that the phrase "indirect highway lighting" is justified.

Similar reflectors have been made of pressed glass and used in large quantity for many years in the tail lamp lenses of automobiles, but these pressed glass reflectors can not be made with enough accuracy to be used for highway lighting. The new colorless, transparent, light stable, synthetic resin (Please turn to page 80)

METAL INLAYS THAT STAY PUT

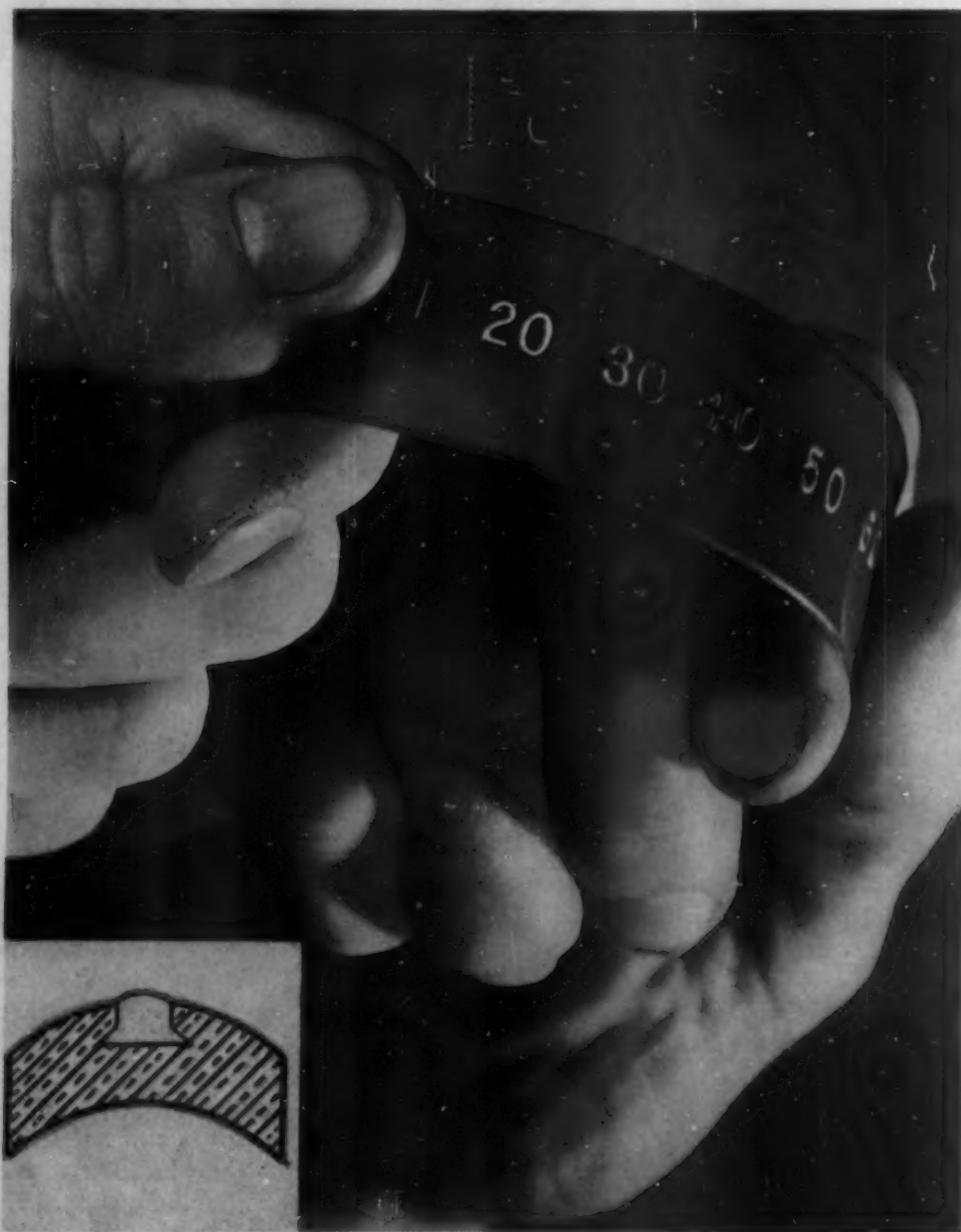
This patented process excites
new interest in metal decoration

METAL INLAYS IN PLASTIC PRODUCTS PROVIDE so many avenues for decorative treatment that a great deal of experimentation has been going on over a period of years. Some have achieved a degree of success with inlays that were molded into the piece but the placing of the inlays in the mold and anchoring them so that the pressure would not disturb their position, slowed up production to such an extent that few have been used.

Now comes a patented process by which metal inlays can be so firmly embedded in any type of plastic material

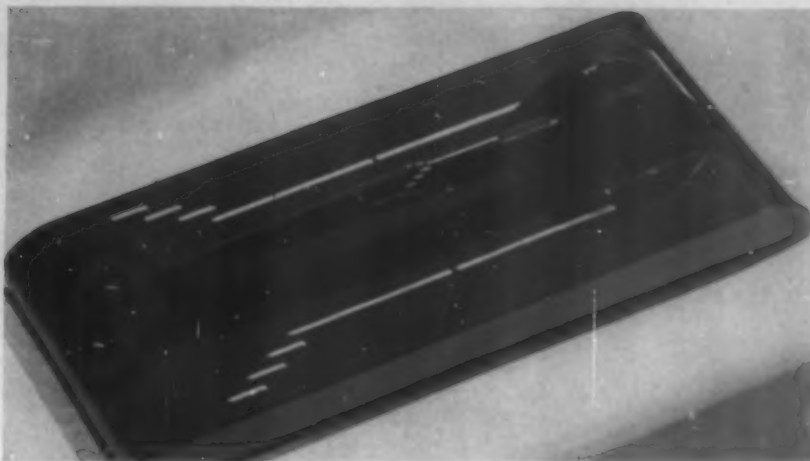
that they won't pop out no matter how roughly the finished article is handled. They are put into the finished product cold—therefore they can be accurately placed with no loss of time in the molding operation. Decorative motifs, names, initials, advertising slogans, trade-marks, etc., can be applied to flat or rounding surfaces in gold, silver, stainless steel, chromium or almost any metal desired.

It all began several years ago when the Chilton Pen Company was looking for a method of decorating their





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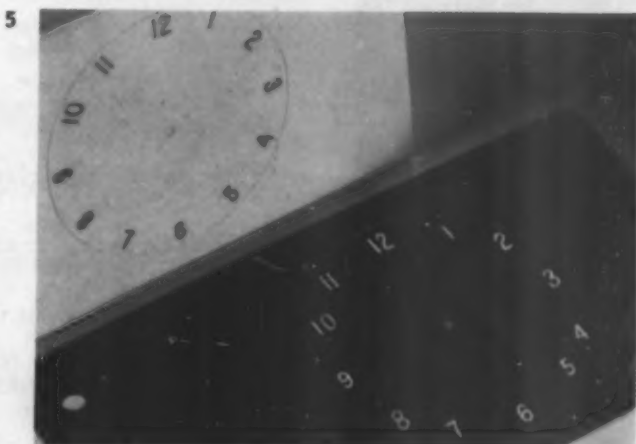
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1. (Opposite page) Shows a cross-section of the metal inlay with its edges spread beneath the plastic surface so it can't come out and a cellulose acetate strip being flexed to prove it. 2. Metal inlays can follow any contour and can be used (3) to decorate flat or curved surfaces. 4. A comparison between gold inlaid initials and molded lettering. 5. Suggestions for clock dials with inlaid numerals on translucent and opaque sheets. 6. Royal example of gold inlay on maroon colored Coronation pen and pencil sets

plastic pen and pencil sets with gold designs in modern motifs. Trouble was that many types of plastics have a tendency to shrink over a period of time and fountain pen material is more susceptible to this change than some of the other plastics. Then, too, pens and pencils, handled more than the average product, are often subjected to various acid conditions, and different degrees of heat and cold, all of which has a bearing on the life of the material. So although they had a clear conception of the effect they wanted to achieve, to get the metal inlays to stay put was something else again. But they kept at it, experimenting and rejecting until in 1935 they hit upon a scheme that did the job they needed.

In the two years that followed, they progressed from metal decorations and designs to individual initials and the idea was so well received and the inlays so satisfyingly permanent that in November 1937 they decided to make the process available for use on other plastic products. A new company called Plastics Inlays, Inc., was organized to handle that portion of the business and the few applications already produced indicate that the inlays have unlimited possibilities in many fields.

The process is simple enough now that it has been worked out and can be applied to either thermosetting plastics or thermoplastics with equal success. It can be used on laminated materials, too, on either flat or curved surfaces. The first requirement is a shallow recession following the contour of the inlay to be placed. This may be molded into the piece on production runs or cut in with a pantograph where a variety of designs is to be used. The inlay (*Please turn to page 80*)





announcing
**THIRD ANNUAL
MODERN PLASTICS
COMPETITION**

In two short years MODERN PLASTICS Competition has gained national recognition because it offers manufacturers, their engineers and designers, in all branches of industry the only opportunity they have to witness in one exhibit, all the important developments of the year in plastic materials and improvements in their technique of fabrication. More than 5,000 visitors came to see last year's exhibition including those from Australia, England, Germany and France.

Entries for the 1938 Competition are now invited and plans are being considered to exhibit the winning entries at the New York World's Fair during the summer of 1939. This means that our Third Annual Competition will bring greater benefits than ever to those cooperating, and we urge you to start planning now to take advantage of this opportunity. There are five groups this year instead of four. First—Industrial.

Two—Scientific. Three—Decorative. Four—Household. And Five, which is a new group, has been set up to accommodate all types of Novelty Items including those in the Style fields.

The Competition is open to all our readers who have used plastics in any way during the past year, the only limitations being that the entries submitted shall have been designed or put into production since August 1937.

Details of the Competition will be found on the entry blank enclosed and as many additional blanks as required will be sent upon request. An early response from those who contemplate entering designs will be appreciated, and the board of judges for each of the five classifications will be announced in a later issue.

The closing date of the Competition is September 15th. Judging will follow immediately after that and the winning entries will be announced in MODERN PLASTICS November issue, together with the complete story and illustrations of each winning design.

MODERN PLASTICS Plaque of Award will be given to the company sponsoring the first, second and third entry receiving highest rating in each classification. Recognition will also be given to the individual engineer or designer responsible for creating the entry, as well as to the molder, fabricator, laminator, material and equipment manufacturers participating in the winning entry in any way.

Please see that all information requested on the entry blank is given in detail and please accompany each entry by a separate blank. All entries should be addressed to MODERN PLASTICS Competition, 425 Fourth Avenue, New York, New York. Please read the entry blank carefully. No entry fee. No other obligation.

PRE-FOCUSED LAMP IN MOLDED CASE

An important engineering advance dramatically introduced

FLASH-LIGHTS HAVE BEEN PRETTY MUCH alike for a good many years. Most of them were provided with some sort of focusing device which with proper adjustment would concentrate the light into a constant beam. This was usually accomplished by raising or lowering the bulb in relationship with the reflector by means of screw threads in the removable caps at either end of the case. Trouble was that in carrying the flash-light about when not in use, the adjustment was frequently changed and had to be re-focused before it would give a good light.

Now comes the pre-focused Mazda lamp, developed by General Electric Co. which requires no focusing mechanism and is so accurately made that it automatically gives a perfect spot of light free from all shadows and distortion. The trick is in a little shelf on the lamp base which is machined to one-thousandth of an inch, and the careful positioning of the lamp filament with no more variance than three-thousandths of an inch in relation to the shelf. The silver plated die cast reflector is

precision built so that when the lamp bulb is dropped into place, the focusing shelf is in automatic adjustment. Screw threads on the lamp base have been entirely eliminated and it is held firmly in place by a threaded plastic plug with spring contact insert which insures a perfectly insulated battery contact and serves as a shock absorber for the lamp as well.

In presenting this radical departure from the traditional, the Usona Mfg. Co. has created a brand new type of flash-light with modern materials and modern design in order to dramatically introduce the convenience and efficiency this new lamp has made possible.

Every part, except the reflector and lamp, is molded of plastic materials, including the lens. The main housing, which contains the batteries and serves as a handle, and the shock absorber, which holds the lamp in place and prevents it from resting directly upon the batteries, are molded of phenolics while the switch, which is of a light green color, is an acetate material. The small end of the handle is molded with a



PHOTO COURTESY DETROIT MOLDED PRODUCTS



The five molded plastic parts illustrated on the opposite page assemble neatly into the pre-focused hand lamp shown above. Even the lens is plastic. The grip or handle was hobbled 7½ in. deep into a solid block of steel to make the mold

easy access to the spare-bulb compartment, is molded of urea in the same color as the switch ring at the opposite end. Even the lens is molded from sheet acetate material and cannot be easily broken.

In speaking of the new flashlight, which is called the Kwiklite Comet, R. G. Williams of the Usona Mfg. Co. said: "Some four or five years ago we began experimenting with plastics for some of our novelty items and have made a great many thousand vest pocket lights or women's purse lights. Last year we used plastics on some of our metal cases to take advantage of their decorative possibilities. But when it came to introducing the pre-focused lamp we decided to go all the way with plastics and we are glad we did. We have never had such instant response to a new item, and by designing a thoroughly modern case, we have quickly focused the attention of the consumer on the greater advantages offered by this new type of flashlight.

"We chose the popular two-battery size because this represents about 75 to 80 percent of the total flash-light sales. It sells at a popular price but is not intended to compete with cheap metal cases. It is a quality prod-

uct throughout and we believe that by giving it a plastic case and lens, it is not only a better looking flashlight, but in addition its permanent finish and unbreakable lens will give it a longer, more useful life. We believe, too, that the "feel" of plastics contributes to their popularity. You see, a flashlight of this sort is used mostly out-of-doors and often during cold weather, but with its plastic case it will never be cold to the touch even under such circumstances."

Tom Martin, Detroit designer, was responsible for the appearance of the Comet and did one thing which every user will appreciate. By designing the switch ring with raised ribs which form the decorative motif, he provides a device which prevents the flashlight from rolling when it is laid down. Slightly raised lines running lengthwise of the case provide a comparatively sure grip even with wet or greasy hands.

August F. Markus was responsible for the mechanical design and in building the six-cavity mold was faced with somewhat of a problem in hobbing the cavities 7½ inches deep into a solid block of steel. It required 2500 tons pressure to do it.

NATURE STUDIES

by EVE MAIN

SNAPPED WITH A PURMA PLASTIC CAMERA



GOOD OLD MOTHER NATURE inspires many a theme for springtime interior decoration and personal accessories. A potent spring tonic for winter-weary rooms is a branch of "dogwood" (left) with lustrous blossoms that will not wilt and fade away. The cleanable white petals are shaped from sheets of cellulose acetate, clusters of tiny synthetic pearls forming the stamens, and the paper wound stems are covered with plain transparent cellulose. (Courtesy du Pont)

Thin strips of rare wood veneers, closely woven into sheets and laminated with a protective coating of thermoplastic, give originality and freshness to little accessories that are so important (right). Patterned in light or dark woods or combinations of the two, they make a smooth, clean lining for men's genuine leather cigaret cases with 14 carat gold trim. (By R. Blackinton & Co.) Fashioned from the same material combined with 24 carat gold electro plated trim, women's light weight, light color cigaret cases and wafer-thin vanities to match have the appearance of wood coupled with the permanence of plastics. (Styled by Bliss) The woven laminated veneer, heated to about 130 degrees on a steam table, is pressed into these shapes in an ordinary cold mold.

Wearable flowers, too, so prominent in fashion circles this spring, can be formed from this laminated wood as indicated by the experimental posies shown.



PARKWOOD

PLASKON

MOLDED COLOR

REVOLUTION IN TOLEDO:

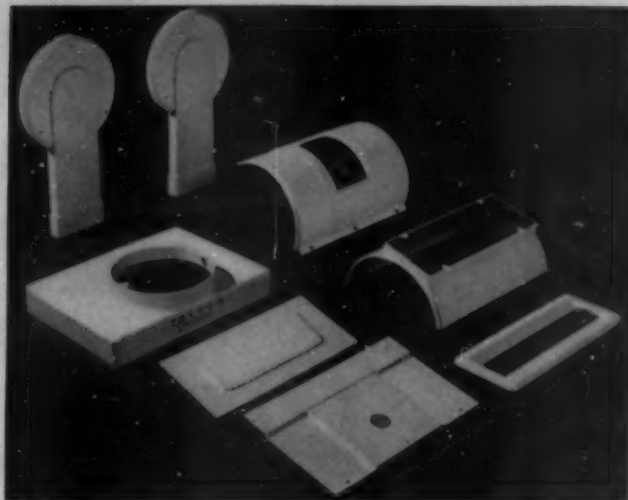
Cutting the weight of a scale from 160 lbs. to 53 lbs., reducing counter space by 40 inches and height by six inches, and lopping a hundred pounds off its shipping weight, through the use of an eight piece plastic housing—is a perfect example of what Plaskon and redesign can do for a product.

Shown below, at right, is the Toledo Guardian scale in its original form, with a housing made of

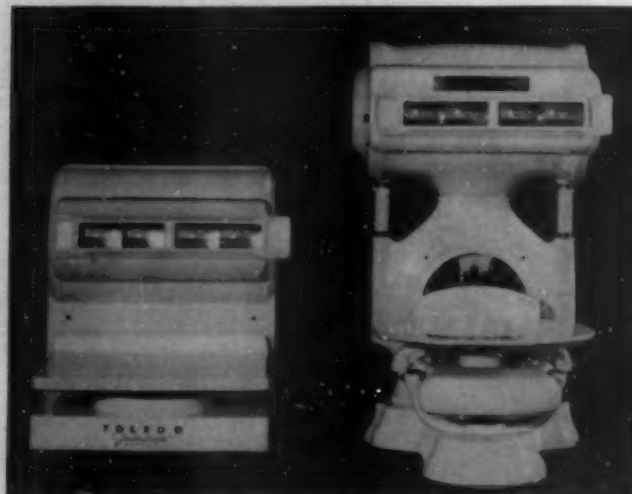


porcelain-enamelled iron castings and weighing 160 lbs., which explained why salesmen rarely carried it into a store for demonstration. After Harold Van Doren and Reynolds Molded Plastics redesigned the housing, the Guardian scale was more accurate, smaller, shorter narrower, far better-looking, and could be carried into stores by the smallest salesman.

Manufacturers of similar large appliances and machines will be interested in designer Van Doren's



novel conception of a built-up housing: eight separate moldings are attached to the chassis which, in turn is built up on the cast aluminum base. This permits greater design freedom and the use of smaller presses to reduce costs, but retains all of Plaskon's advantages. With this new method of assembly, heavy-duty machines such as typewriters, cash registers and the like, can now be enclosed in Plaskon cases at lower cost, and with greater strength in the final assembly.



MAY, 1938

CALVERT'S CALL FOR PLASKON:

Next time you're in a bar, take special note of the pouring devices on the top of Calvert's Special and Reserve bottles. They're a new Dalynip designed with the lettering and details wiped-in.

Behind the new Dalynips is Calvert's theory that people who see them on bar bottles will sneak them home where they will cause comment and drive home the Calvert name. Ingeniously molded



in two halves cemented together, the pourers are designed with the lettering and details wiped-in in contrasting colors.

Incidentally, of all the plastic materials tested for use on Dalynip pourers, only Plaskon passed all the tests—for absence of odor, for alcohol resistance, and for non-bleeding. Molded by Universal Plastics Corporation.



PLASKON PARLAY:

A new way to gamble—based on the slot machine principle that pays off when the three apples or cherries appear together—is the Brodi game, manufactured by O. Schoenhut, Inc., Philadelphia, and enclosed in a Plaskon—Molded Color—case.

Red, blue, green and ivory Plaskon are the colors used, and the case is a one-piece molding. Colored chips are included in the set, and the game can be played in several ways. Advantages of the Plaskon case are a permanent, chip-proof lustre, gay colors, absence of seams and joints and lightweight. Molding is by Kuhn & Jacobs Molding & Tool Company.

BUTTON NOTE:



After seventy-five years of collecting, a Perry (N.Y.) woman says she has accumulated 14,882 buttons, no two of which are alike . . . (Hundreds of them are molded of Plaskon, which is used to make millions of white and gayly-colored buttons every year).

PLASKON COMPANY
INCORPORATED

2721 SYLVAN AVENUE, TOLEDO, OHIO
CANADIAN AGENTS: CANADIAN INDUSTRIES LIMITED, MONTREAL, P.Q.



CHICAGO MOLDED PRODUCTS CORP.

NEW CAMEO DISPENSER

by J. BERNARD LUNDY*

In which a publicity man goes berserk—
but he's really got something here

PLUCK, FROM THE THIN AIR, ONE MERCHANDISING idea. Wrap well in plastic. Put the cork in the red ink and phone the Missus you'll be late to dinner for several weeks. Since the Cameo Cleanser Dispenser was introduced ninety short days ago, the sales department is suffering from writer's cramp, the shipping clerk's wife is suing for divorce charging desertion, and the advertising manager is walking around rhapsodizing about consumer acceptance. Newspapers write about it; hostesses offer the once lowly household cleanser as a bridge prize.

All of which is a somewhat enthusiastic way of saying the public is liking the new Cameo dispenser, by the tens of thousands. Advertisers figure the cost of getting new customers at anywhere from three dollars to twenty-five, depending on the consumer education necessary to acceptance of the product. Keeping the customer a customer also costs money.

Faced with the problem of achieving ready consumer acceptance at a minimum cost, the Cameo Corporation

considered a number of proposals, hit at last on the plan of using a molded plastic dispenser for their cleanser. Idea was that an attractive dispenser would smooth the path of the cleanser itself, creating the urge to buy despite the additional cost a dispenser would involve. Considered also was the tendency of the consumer to continue buying Cameo brand cleanser because in addition to appreciating its effectiveness, she likes its pleasant scent. Furthermore, only Cameo brand will fit into the dispenser. Lastly, only a molded plastic could provide the advantages of attractive and pleasing color.

The new dispenser has a base of black phenolic which screws onto the urea cylinder. The Cameo emblem is cellulose acetate. Base and emblem are standard color; the cylinder is available in a wide range of kitchen and bathroom colors.

Picture above shows the sure easy grip, even with wet hands; also the molded parts. Insert illustrates the smartness of the package both in appearance and in its ability to accommodate refills of Cameo Cleaner exclusively.

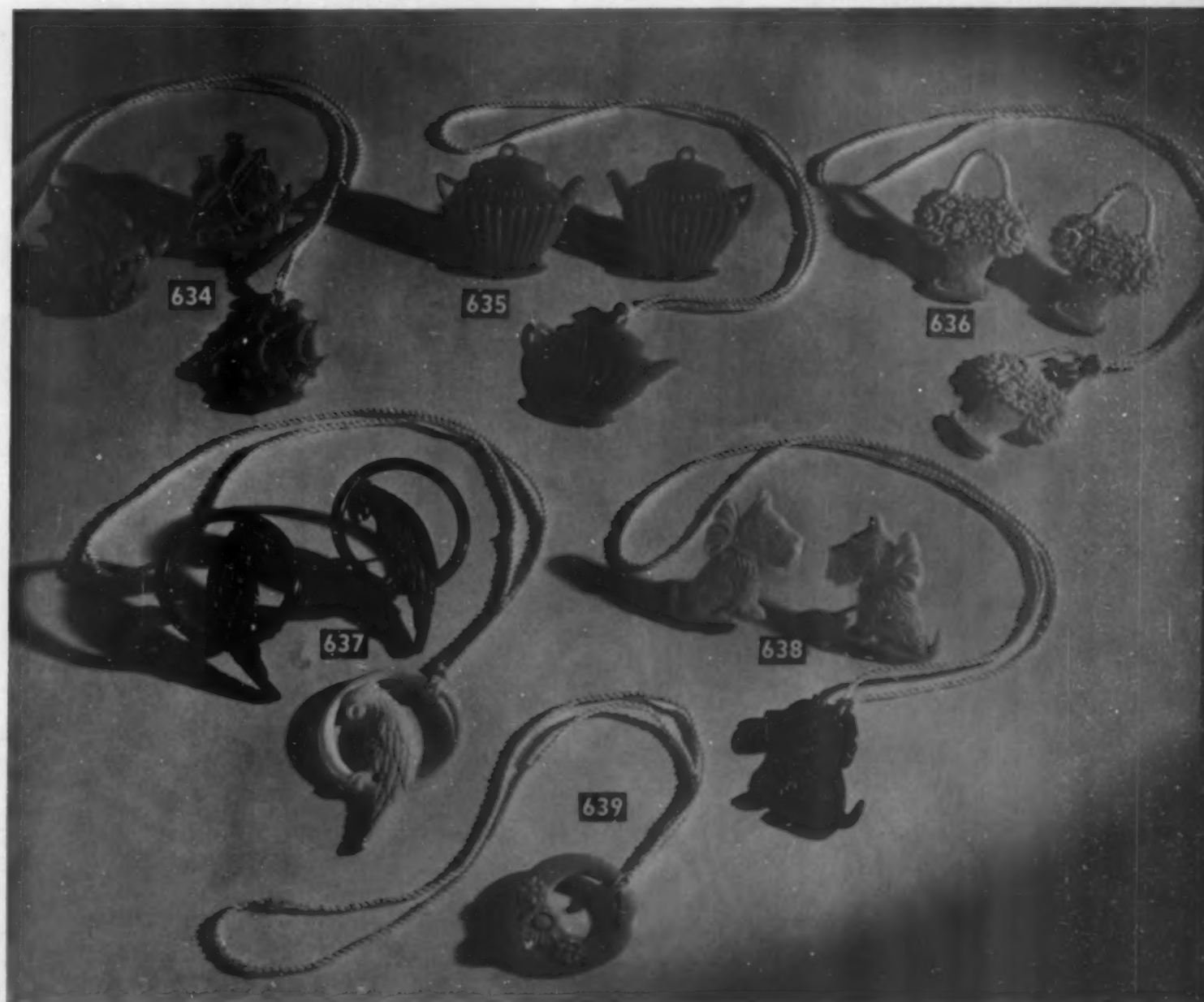
* Barnes & Reincke, Industrial Designers

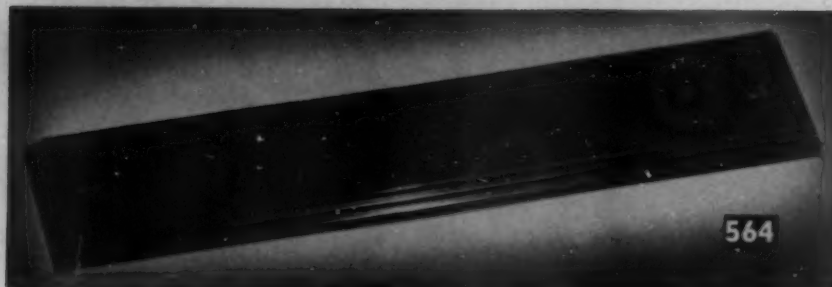
STOCK MOLDS

SHEET FIFTY-FIVE

These shade pulls and tie backs are available in the patterns illustrated and each may be had in a variety of pastel shades such as light blue, ivory, pink, turquoise, green and darker shades including red and black. They are injection molded from cellulose acetate material and each of the pulls is equipped with a silk cord which slips through an eye in the shade. The tie backs have push pins embedded in the back for fastening. They may be purchased from stock molds in any reasonable quantity either for premium items or retail sale. Specify item number as well as sheet number when writing for samples. Inquirers should write on company letterhead

Address all inquiries to Stock Mold Department, Modern Plastics, 425 Fourth Avenue, N. Y. C. All molders are invited to send samples from stock molds to appear on this page as space permits





STOCK MOLDS

SHEET FIFTY-SIX

Molded handles and knobs have many uses, sometimes far removed from the original purpose for which they were made. These pictured may be obtained from stock molds and quantity quotations will be gladly sent to interested executives who write on business stationery. Even small quantities may be purchased with economy



564. Picture frame base with openings at either end $7/16$ in. square for attaching chromium rods. Length, $9\ 3/4$ in., width, $1\ 3/4$ inches

580. Pyramid knob. Opening for $1\ 1/4$ in. shaft. $3/4$ in. diameter

581. Dome knob $3/4$ in. diameter at top with 8-32 insert

582. "Streamlined" ball with brass insert. $5/16$ in. diameter

583. Knob $5/8$ in. diameter and $9/16$ in. high, with brass insert

584. Octagonal cap with $3/8$ in. diameter

585. Oblong turn handle with decorated top. Base $1/2$ in. high. Opening $1/4$ in. diameter

586. Handle with opening $1/4$ in. diameter. Length $2\ 1/2$ inches

591. Hollow threaded cap $11/16$ in. diameter and about $1\ 3/8$ in. high

592. Same as 591 without threads and with a molded-in hole at top, $3/16$ in. diameter

593. Knob 1 in. diameter with brass insert. $1\ 3/16$ in. long

594. Knob 1 in. diameter and 1 in. long

595. Knob $15/16$ in. diameter and $1\ 1/16$ in. long

596. Knob $15/16$ in. diameter and $15/16$ in. long

597. Knob $13/16$ in. diameter, $1\ 5/16$ in. long

598. Knob $13/16$ in. diameter, $3/4$ in. long

599. Knob $7/8$ in. diameter, $3/4$ in. long

600. Knob $3/4$ in. diameter, $1\ 1/16$ in. long

Address all inquiries to Stock Mold Department, Modern Plastics, 425 Fourth Avenue, N. Y. C. All molders are invited to send samples from stock molds to appear on this page as space permits

TECHNICAL SECTION

NATURAL RESINS IN PLASTICS

by C. L. MANTELL*

THE NATURAL RESINS ARE EXUDATIONS OF trees of many different genera and species. The products of different species appear on the market as different resins. These secretions or exudations may be those of living trees or may be the fossilized products of trees long dead. From the botanical and forest viewpoint, the trees and their resins have been thoroughly and competently studied over long time periods. The natural resins are not subject to vanishing supplies of raw material. Being the products of trees which themselves are capable of infinite removal and increase, the resins from the trees are continuously produced.

The varnish trade usually refers to the natural resins as "gums." In strict terminology, however, the gums are related to the sugars and carbohydrates. They are soluble in water, forming viscous solutions, and insoluble in drying oils and organic solvents. On heating, they decompose completely without melting. In contradistinction, the resins are insoluble in water, more or less soluble in organic substances and vegetable oils, and are chemically related to the terpenes or the essential oils. On heating, the resins melt with the distillation of volatile oils terpenic in nature. The residue, termed "run" gum or resin by the varnish maker, is soluble in hot vegetable oils. Some of the softer resins are directly soluble in solvents or oils, but in all cases are totally insoluble in water.

In general, the natural resins are divided from the point of use into those which are spirit soluble—the "spirit" originally meaning alcohol but now embracing a large variety of solvents—and those which are oil soluble. The first class is generally soluble directly, while the second needs to be processed by thermal methods. The spirit soluble resins are in general of the soft variety, while the oil soluble are usually hard. The resins are known under names which are indicative either of their source of origin, or of a distinguishing characteristic of the resin, or of the port at which they enter commerce. They are further classified into three major types: the damars, which include those known under the name of Damar, and the East Indies which are semi-fossil damars; the copals, including the Manilas with their wide range of hardness from the soft Melengk through stages of hardness and fossilization to the hard Boea, as well as the Congos which are the hardest of the natural resins, and the Kauris; and the third group which are in a miscellaneous class including the very soft Elemi, the Accroides, Mastic and Sandarac. There is a practically continuous series as regards solu-

bility and hardness, from the hardest copals of the fossil type to the softest damars obtained from fresh tappings.

The natural resins in general originate in the Congo district of Africa, from which the resin is named, New Zealand, the Netherlands East Indies, Malaya, the Philippine Islands and adjacent territory. They are obtained from definite species of trees in a systematic manner, generally under governmental supervision.

In general, the natural resins, which by its terminology excludes shellac and rosin, are not thermosetting or thermoplastic. When, however, copals of the Manila class are reacted with glycerine or with glycerine and maleic anhydride or with a partially reacted glycerol phthalic anhydride mixture and with glycerine mono and diacetates infusible, insoluble products of a plastic nature are produced. The addition of bases or of calcium chlorate or similar salts to molten Manila resins does not protect it from gelling with glycerol. The course of the reaction can be fairly accurately followed. Some interesting thermosetting molding resins have been produced by control methods employing these reactions.

Copals of the Congo class are insoluble and may be molded to an appreciable extent under carefully controlled conditions to produce varieties of synthetic amber. More interesting applications result from the dispersion but not true solution of Congo in solvents of the higher molecular weight alcohols. Cast resinous products may be produced from these gels. If the gels have air mechanism incorporated or small amounts of water dispersed in them, white cast types of plastics may be produced. The Congo Dust may be incorporated with fillers and hot molded. Where color is no object, and partial distillation of the resin be permitted, the Congo Dust gives cheap plastics.

Over the entire range of natural resins, their utility in the plastic field is primarily that of softening agent or retarding agent during hot molding of thermosetting plastics. Some use has been made of the natural resins in wax compositions employed as molded products where the natural resin in addition to the wax greatly increases stiffness, softening and melting points, and susceptibility to shock.

The natural resins deserve more attention as plastic raw materials due to the wide range of characteristics, large availability and low cost. Their imports into the United States are currently of the order of forty to fifty million pounds annually. The greater share of these imports at the present moment are consumed in the paint and varnish industry, the group of operations which is technically and chemically related to plastics.

* American Gum Importers Association, Inc.

MOLDS FOR PHENOL RESINOIDS

by T. E. CASSEY*

Concluding installment continued from our April issue
and reprinted by permission from August 1937 issue
Journal of The American Society of Naval Engineers

Force and bottom plates

The top and bottom plates of the mold which transmit the force (pressure) from the press platens to the molding charge via the force plug are termed "force plates" or under a closer definition, the upper plate may be designated as the "force plate" and the lower plate as the "bottom plate." Force and bottom plates should be sufficiently rigid to prevent distortion during the molding operation.

For Government-owned molds experience has dictated certain desirable requirements for the force and bottom plates, as follows:

The thickness of these plates in no case should be less than $\frac{7}{8}$ inch.

The force and bottom plates should be of the same overall dimensions, and the overhang of the plates should be not less than 1 inch.

Projections of the force and bottom plates should have no holes or slots, these plates being secured to the press by clamping.

These plates shall be made of the best quality machine steel, pack-hardened and ground perfectly smooth.

Force and bottom plugs

The plunger or piston which applies the actual force to the molding charge is called the force plug. The force plug forms the upper face of the molding cavity in the completed closure position of the mold.

The force plug should be recessed in the force plate to a depth of not less than $\frac{1}{4}$ inch and secured by Allen head machine screws in a manner insuring accurate alignment at all times. Where practicable, and where space will permit, the size of machine screws should be $\frac{1}{2}$ inch diameter. At least 3 machine screws should be used for securing the force plug to the force plate.

In some cases where it is found impracticable to secure the force plug to the force plate by recessing, a method is used involving the use of a center plug, forming a part of the force plug and passing through the full thickness of the force plate. The diameter of this center plug should be not less than 25 percent of the area of this force plug, and not greater than $1\frac{1}{2}$ inches diameter. The force plug with this arrangement is secured to the force plate by machine screws as described above. The first method described is considered preferable and is required for Government-owned molds wherever practicable.

The force plug should be of the same steel and of the same degree of hardness as described for the mold chase.

Where a bottom plug is used in the mold construction, the plug may or may not be secured to the bottom plate. When secured, it should be secured in the manner described for the force plug.

The minimum thickness of this plug should be $\frac{3}{4}$ in. The bottom plug should be of the same material as the force plug.

Guide pins: Two sets of guide pins, one top set and one bottom set, are usually provided. The bottom set of guide pins, which are secured to the bottom plate, position the chase as it rests on the bottom plate. The top set of guide pins maintain proper alignment of the top force (force plate and plug) with the chase as the mold closes during the molding operation. A minimum of three pins, top and bottom, are required, with the pins located so that the plates will assemble in one position only, and prevent their interchangeability.

Guide pins in the force plate should be of length sufficient to extend beyond the force plug so as to prevent undue wearing between the force plug and the chase due to improper registration.

The holes in the chase that receive the guide pins should extend all the way through the chase and should have a close fit with the pins. Directly in line with the holes in the chase, and in the opposing plates from the top and bottom sets of guide pins, holes are drilled of the same diameter so as to preclude the possibility of the guide pins bottoming on any chance material falling into these holes.

Guide pins shall be of tool steel or drill rod, oil hardened to Rockwell 65 or Scleroscope 75-80.

The mold manufacturers differ in the methods used securing guide pins to the plates. One method is to "shoulder" the pins and recess them to a depth of from $\frac{1}{4}$ inch to $\frac{1}{2}$ inch in the plates, against the shoulder, and then to flush rivet. Another method advocated is to use a drive fit through the plates with a slight taper in that section of the guide pins being driven into the plates. A third method is to shoulder the pins and slightly taper, and then force the pins into holes in the plates, the holes not being drilled completely through the plates. It is believed the first method is preferable and this method is being specified for Government purchases of molds.

Guide pins should be $\frac{3}{4}$ inch diameter for multiple cavity molds and for single cavity molds producing a

* Chief Electrical Draftsman, Bureau of Engineering, Navy Dept.

piece having a length or diameter exceeding 2 inches. Guide pins for other molds should be of size as approved for the specific case.

Mold pins. The mold should be provided with the necessary number of mold pins for holding inserts and forming holes as required by the design of the molded piece. These pins are of various sizes, lengths and shapes, and in general may be classified, as follows, according to the duty performed:

Insert holding pins (parallel to direction of travel of force plug).

Hole forming pins (parallel to direction of travel of force plug).

Knockout hole pins.

Insert holding pins (90 degrees from direction of travel of force plug).

Hole forming pins (90 degrees from direction of travel of force plug).

Insert holding pins should be rigidly secured in the molds and the mechanical assembly of these pins should be such that the pressure exerted on the pins will not be directly applied to the platens of the press, but will be taken up first by the chase, the force or the bottom plate.

Mold pins should be formed of the best quality hardened tool steel or drill rod, oil hardened. Surfaces in contact with the charge should be highly polished. In general, pins should be hardened slightly less than parts of the mold that they contact.

Insert holding pins (Parallel to direction of travel of force plug)

The diameter of insert holding pins should be larger than the outside diameter of the inserts except where it is required that the molded material make definite flush contact with the exposed end of the insert. The position of the molded piece should always be such that insert holding pins will be of minimum length compatible with other design considerations.

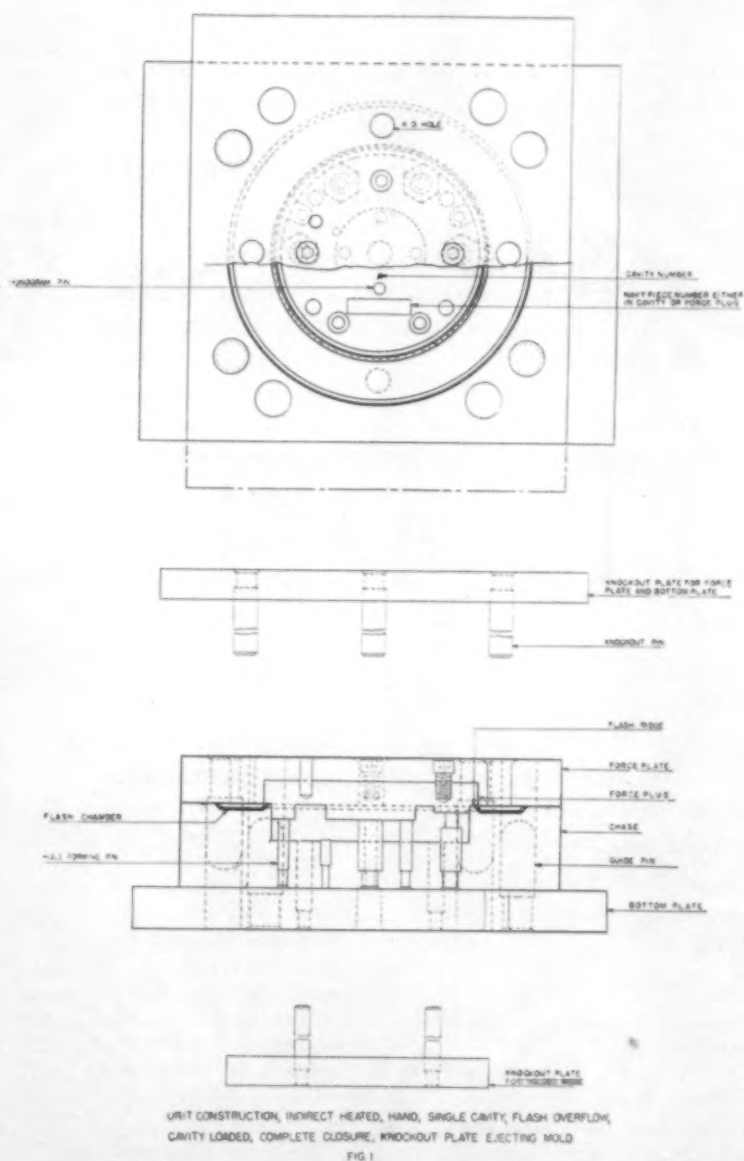
Due to the breakage of insert holding pins, the occurrence of which may be frequent during molding operations, these pins should be so assembled in the mold that they may be readily removed and replaced without requiring a major repair of the mold and a consequent interruption in the molding production.

Figure 1 shows these pins shouldered and riveted in place which, from experience to date, appears to be the most generally acceptable method. If in riveting these pins, the ends of the pins are only "headed" enough to hold them rigid, they can be readily knocked out in event of breakage, which arrangement should satisfy the required replacement feature.

Other methods of securing these pins are advocated by the manufacturers, and it is recognized that due to their varied application, one specific method of securing these pins cannot be made universal. Possibly the most satisfactory substitute method of securing these pins, particularly when they are mounted in the cavities or in the force plug, is the "shoulder type drive" fit which involves the use of a shouldered pin with the "shoulder end" having a slight taper. A through hole of smaller diameter is provided in the cavity or plug carrying these pins, through which a drive pin can be inserted to force out the pin if broken. One other method in use where pins are over $\frac{3}{8}$ inch diameter, is to embed them in the plates a distance equal to the pin diameter and then secure by machine screw. The hole for the machine screw serves as a knockout hole in the event of the pin becoming broken.

According to the location of the inserts required for the molded piece, insert pins are located in the cavity, force plug or bottom plate as the case may be. These pins may also be mounted in a separate "pin plate." When so mounted they can be shouldered and riveted without any adverse results.

Where inserts have an interior tap, the mold pin may have a threaded end to receive the insert, or a spindle end which is forced into the tapped hole. This latter method is favored by molders as it is cheaper than using the threaded mold pin. This method, however, has the disadvantage of injuring the threads of the insert, requiring a retapping operation. As inserts are generally brass, and moreover, as tapped holes (*Please turn to page 72*)



PERMANENCE OF PLASTICS*

by GORDON M. KLINE
National Bureau of Standards

Continued from April issue of Modern Plastics

SOME EXPERIMENTAL RESULTS OBTAINED IN a comparative study of the deterioration of transparent plastics when exposed out-of-doors and when subjected to ultraviolet light from a carbon arc are presented in Table 1. The condition of the specimens after 500 hours' exposure to carbon arc light is shown in Fig. 4. It will be observed that in the case of the cellulose acetate and cellulose nitrate samples there is very little indication after 500 hours' exposure to the carbon arc lamp of the very pronounced action which sunlight has on these materials over a period of six months. Tests made with a carbon arc lamp using a 20-minute cycle water spray over a period of 1000 hours, which requires practically continuous operation of the weathering apparatus for six weeks, also failed to correlate well with the results of outdoor exposures. The roughening of the surface of the methacrylate sample J1 (probably molded) and the rapid discoloration of the vinyl chloride-acetate resin upon exposure to the carbon arc light, as indicated in Table 1, can be attributed to the relatively high temperature, 55° C., to which the samples were subjected in the course of this test.

A recent U. S. Navy Specification for Transparent Plastic Sheet, P-41 dated October 8, 1937, prescribes a test which employs a General Electric Sun Lamp using the

type S-1 bulb which is a combination incandescent tungsten filament and mercury arc lamp. This is an interesting development because it offers a possible accelerated aging test using much less expensive equipment than heretofore available. The use of a turntable device on which 10 to 12 specimens can be fastened and revolved under the lamp to subject them all to equal intensity of light is suggested, rather than centering one specimen directly under the bulb as called for in the above specification. Tests to determine the relative breakdown, effected by the carbon and mercury arcs and the Sun Lamp, of various transparent plastics are now underway at the National Bureau of Standards.

2. Heat

The classification of molded insulating materials according to their tendency to deform at elevated temperatures has already been mentioned. In the British test the specimen mounted as a cantilever, is preheated for 15 minutes at the test temperature, and a load of 450 grams is then applied for six hours. The "plastic yield" shall not be more than 5 mm. at the end of this period. The "yield temperature" is obtained by interpolation from a temperature-deflection curve. The recognized British categories thus determined are:

(Please turn to page 76)


TABLE 1.—COMPARISON OF ROOF EXPOSURE (MARCH TO AUGUST, INCLUSIVE) AND CARBON-ARC ACCELERATED AGING OF TRANSPARENT PLASTICS

Material	Sample	Roof exposure			Carbon-arc light exposure		
		Haze value		Remarks on condition of specimen	Haze value		Remarks on condition of specimen
		Initial percent	6 months percent		Initial percent	500 hrs. percent	
Cellulose acetate	A1	4.1	14.4	Crazed; discolored	3.8	4.4	Surface slightly roughened
Do	B3	3.6	5.1	No marked change	3.6	4.0	Do
Do	C1	6.4	11.5	Pebbled	6.0	6.0	Do
Do	D1	7.2	16.5	Crazed and cracked	7.0	9.3	Blue dye faded; cracked
Cellulose acetobutyrate	S1	5.4	4.6	Unchanged	5.5	4.1	Warped; no marked change
Cellulose nitrate	E1	3.2	83.8	Crazed; opaque	3.8	6.9	Discolored; crazed
Do	F1	4.2	84.8	Do	3.6	4.1	Discolored
Ethylcellulose	H1	9.0	..	Broken off and lost	9.9	10.2	No marked change
Do	I1	5.8	86.3	Crazed; opaque	6.1	..	Cracked; friable
Methacrylate resin	J1	4.4	5.3	Slight crazing	6.1	10.6	Surface pebbled
Do	J2	3.5	4.8	No marked change	6.1 ^b	4.7 ^b	No marked change
Do	K1	2.7	2.5	Do	3.6	3.5	Slight discoloration
Do	K2	2.6	3.4	Slight crazing	1.4	1.9	No marked change
Vinyl chloride-acetate resin	L1	6.3	11.1	Crazed; discolored	5.0	ca. 100	Opaque; discolored
Vinyl acetal resin	M1	3.2	74	Surface roughened	3.9	7.8	Discolored
Glyceryl-phthalate resin	O1	7.7	9.4	Unchanged	5.2	5.8	Do

* Paper presented as part of a symposium on plastics at the Rochester meeting of the American Society for Testing Materials on March 9, 1938. Publication approved by the Director of the National Bureau of Standards of the U. S. Department of Commerce

^a Specimen broke before this value could be determined.

^b Specimen slightly prismatic, making haze measurement doubtful.



*Banthrico coin banks injection-molded of
Tenite by Elmer E. Mills Corporation.*

TENITE SAVES MONEY

IN A FEW SECONDS . . . in one automatic operation . . . a completed coin bank shell is molded of Tenite ready for assembly. No finishing necessary—no metal parts to polish or plate. The Tenite shells for this unique calendar bank come from the mold with a smooth, lustrous finish.

Assembly is fast. Four slots are milled in the Tenite, the mechanism inserted and locked. The bank is ready for delivery—ready for a daily coin to keep its calendar up to date.

Scores of popular products have gained production economy, new beauty or improved design by the use of Tenite. In mass production by leading manufacturers today are Tenite saw handles, steering wheels, radio parts, building hardware, typewriter keys, costume jewelry, and fish lures.

TENITE REPRESENTATIVES:
New York: 10 East 40th St.; Chicago:
2264 Builders Bldg.; Detroit: 914
Stephenson Bldg.; Leominster, Mass.:
25 Merriam Ave.; Pac. Coast: W. & G.
Meyer & Co., San Francisco: Federal
Reserve Bldg.; Los Angeles: 2461
Hunter St.; Seattle: 710 Belmont Pl.

Tenite is a tough, practically unbreakable plastic made of Eastman cellulose acetate—in every color: plain, variegated, transparent, opaque. A 52-page illustrated book on Tenite and its uses will be sent you on request.

TENNESSEE EASTMAN CORPORATION, KINGSPORT, TENN., Subsidiary of Eastman Kodak Company

PLASTICS DIGEST

This digest includes each month the more important articles (wherever published) which are of interest to those who make plastic materials or use them

General

PLASTICS: SOME APPLICATIONS AND METHODS OF TESTING. T. S. Taylor. *Proc. Am. Soc. Testing Mat.* 37, Pt. II, 5-21, 1937. A survey of the uses of the various types of organic plastics.

PLASTICS AND NATIONAL SOCIALISM. T. H. Gant. *Chem. and Ind. (London)* 57, 263-6 (Mar. 19, 1938). A discussion of Germany's development of synthetic materials to make herself independent of outside supplies of cotton, rubber, and, for some purposes, copper, brass, and tin.

ORGANOLITES: ORGANIC BASE-EXCHANGE MATERIALS. H. Burrell. *Ind. Eng. Chem.* 30, 358-63 (Mar. 1938). The organic counterparts of zeolites are called "organolites." It was found that organolites prepared by rendering initially water-soluble wood extracts, especially those of the tannin type, insoluble by treatment with concentrated sulfuric acid possess certain advantages over the phenol-aldehyde resinous type, especially as to cheapness, high exchange capacities, and resistance to attack by waters of widely varying pH. They may be useful in the fields of water softening, acid regeneration, and for special cation absorption.

Materials and manufacture

PROTEIN PLASTICS FROM SOYBEAN PRODUCTS. A. C. Beckel, G. H. Brother, and L. L. McKinney. *Ind. Eng. Chem.* 30, 436-40 (Apr. 1938). Water-plasticized material analogous to casein plastics from soybean meal or protein can be prepared, but modified procedure would be necessary. Reduction below about 5 percent moisture in soybean meal or protein yields a plastic whose properties resemble those of zein rather than those of casein. Using this dehydrated protein base, it should be possible to develop resinouslike plastics that would come finished from the die and have greater water resistance than would be possible with water-plasticized material.

HARDENING CASEIN PLASTICS WITH FORMALDEHYDE. G. F. Mougeot. *Rev. Gén. Mat. Plastiques* 14, 35-7 (Feb. 1938). Optimum conditions for hardening casein plastics are described. Among these are mentioned a concentration of formaldehyde of 6 to 10 percent, a pH of about 6.0, and a temperature of 18° to 20° C. Agitation during treatment serves to speed up the process and prevent warping. Certain electrolytes have a pronounced effect on the rate of hardening.

CHLORINATED RUBBER PLASTICS. J. Daubigny. *Rev. Gén. Mat. Plastiques* 14, 17-20 (Jan. 1938). A discussion of attempts

to develop a molding composition from chlorinated rubber.

REVIEW OF BRITISH PATENTS DEALING WITH ETHENOID RESINS (ACRYLATES, STYRENES, AND VINYL). C. A. Redfarn. *British Plastics* 9, 546+ (Mar. 1938). Abstracts of patents. Not complete in the one issue.

Molding and fabricating

KEEPING SCRAP COSTS AT A MINIMUM. *British Plastics* 9, 543-4+ (Mar. 1938). The major causes of rejected moldings are considered. Keep powder from becoming damp or being exposed to elevated temperatures before use. Keep weighing scales clean. Hard pellets cause flow marks and excessively soft ones chip, resulting in short weight. Work out proper mold breathing conditions at start of job. Watch for mold injuries closely, particularly on large pieces. Select powder of proper flowing qualities. Use a lenient curing cycle rather than a bare minimum. Check small inserts carefully to avoid scrapping the more costly molding. Keep records of molding conditions on each job.

MANUFACTURE OF CASEIN BUTTONS. J. Delorme and R. Bluma. *Rev. Gén. Mat. Plastiques Supplement* 14, 13-15 (Jan. 1938). The equipment required for the manufacture of casein buttons is illustrated and the approximate cost of installing same is discussed.

BANJO TYPE 20 PERCENT OF STEERING WHEEL PRODUCTION. H. Chase. *Automotive Ind.* 78, 200-3+ (Feb. 12, 1938). The banjo wheel is a combination of metals and plastics. The hub is a zinc alloy die casting, subsequently plated or coated. The spokes are stainless steel. The rim has a core of carbon steel around which cellulose acetate is molded in the desired color to harmonize with the interior trim. The molding process is described.

Applications

INSULATED PLASTIC TUBING. P. Nabb. *Plastics (London)* 2, 100-2 (Mar. 1938). The plastic tubings are compared with textile, paper, and rubber insulation as to advantages and disadvantages. Experimental data are cited for weight and dimensional changes of sleeveings made of cellulose acetate, varnished fabric, and polyvinyl chloride resin when subjected to various conditions of temperature, humidity, and water immersion for 24 hours and 4 weeks.

REINFORCED ARTIFICIAL RESIN BEARINGS. *Engineer* 161, 60 (Jan. 14, 1938). Laminated phenolic-resin-canvas products have been found to be more satisfactory than metal bearings for many purposes. A specific in-

stance is cited of bearings on an electrically driven rolling mill which in bronze lasted only 48 hours, but which in plastic were used for three weeks to 3 months and lowered the peak load by 300 amperes. A tolerance of not less than 0.3 percent of the shaft diameter is allowed for swelling and it is when close fitting is not required that synthetic resin bearings replace metal ones.

SIGNS FROM PLASTICS. E. Wirth. *Kunststoffe* 28, 67-9 (Mar. 1938). The preparation of translucent signs from laminated urea-formaldehyde resinous products is described.

SYNTHETIC HIGH POLYMERS IN WIRE AND CABLE MANUFACTURE. P. Nowak and H. Hofmeier. *Kunststoffe* 28, 54-6 (Mar. 1938). The electrical properties of vinyl chloride resin, butadiene (Buna) polymer, and mixtures of the latter with polyisobutylenes and polyacrylates are considered.

Synthetic coatings

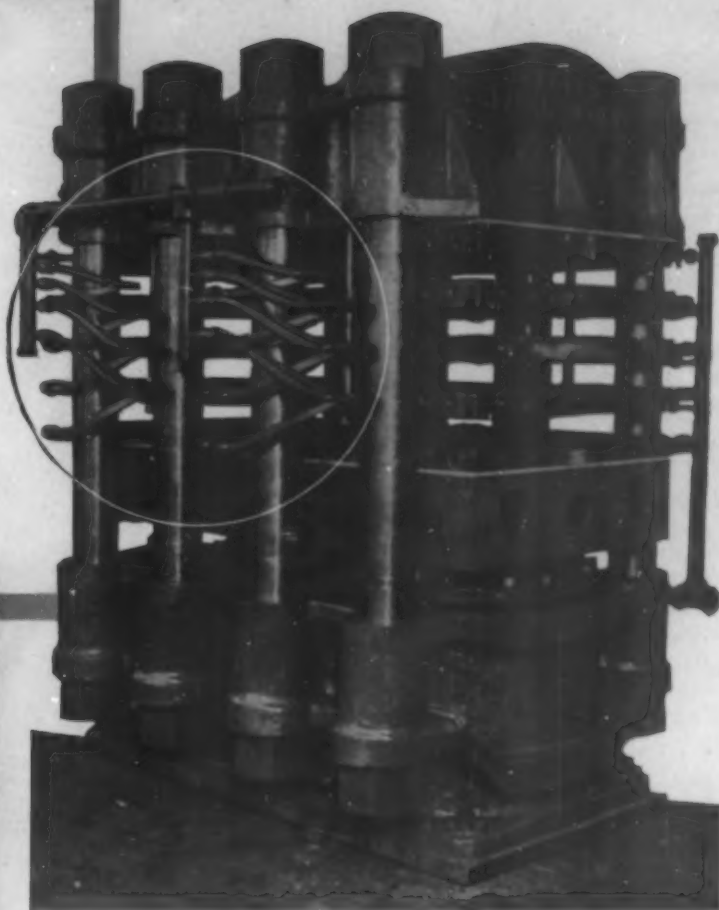
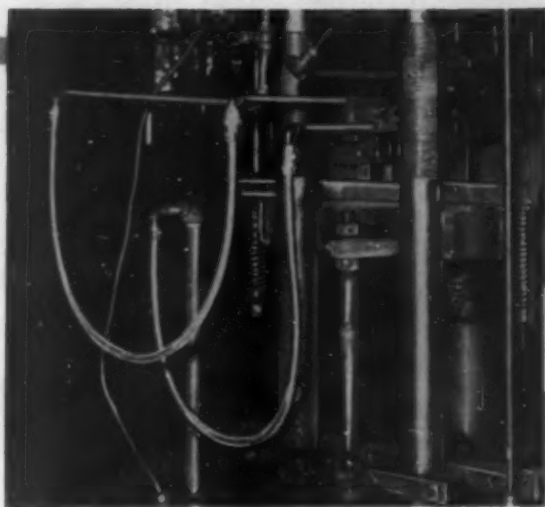
SYNTHETIC RESIN ENAMEL FINISHES. J. L. McCloud. *S. A. E. Journal* 42, 131-6 (Mar. 1938). The latest change in the finish of cars is from nitrocellulose lacquers to synthetic-resin enamels. Improvement is obtained in time of application, the saving being mostly due to the ability to apply at one time more substantial coats and the diminished need for polishing. But the main improvement has been in the increased durability of the film surface and the underneath layers. The time is still measured in hours to apply, but the life is to be measured in years, rather than in weeks and months, as was done formerly. The achievement of lasting quality with new pigments, both synthetic and natural, new oil resin vehicles, and new thinners, and the development of new methods of application and baking in the Ford Motor plant are discussed in detail.

RÉSUMÉ OF SYMPOSIUM ON CORRELATION BETWEEN ACCELERATED LABORATORY TESTS AND SERVICE TESTS ON PROTECTIVE AND DECORATIVE COATINGS. A. C. Elm. *Proc. Am. Soc. Testing Mat.* 37, Pt. II, 467-77, 1937.

PAINT SPECIFICATIONS. R. J. Moore. *Steel* 102, 56-9 (Feb. 28, 1938). Main requirements for anti-corrosive primers are flexibility, high moisture resistance (7 hours boiling water), alkali resistance (24 hours in 5% NaOH), and the presence of an inhibitor (zinc chromate). Finishing coats should dry hard in 3 hours, resist 7 days in water at room temperature, 24 hours in boiling water, 96 hours in 5% NaOH at 70° F., 96 hours in 15% H₂SO₄ at 70° F., 6 hours in gasoline, and 6 hours in 50% alcohol.

FACTORS INFLUENCING OIL-SOLUBILITY OF PHENOL-FORMALDEHYDE RESINS. P. Trévy. *Rev. Gén. Mat. Plastiques* 14, 11-15 (Jan. 1938). In addition to incorporation of rosin or fatty acids into the resin molecules, other modifications of the reacting materials to obtain oil solubility include the use of naphthols, hydroxydiphenyls, alkyl phenols, xylenol and its derivatives, and diphenylpropane.

Flexible Metal Tubing *that is* really seamless



American Seamless is simply installed on plastics molding presses and is thoroughly dependable for a long life without benefit of attention.

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ible metal tubing, call for the strongest, corrosion-resistant, long-life type of connector that can be found. American Seamless Flexible Metal Tubing is manufactured to fulfill these requisites.

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American Metal Hose Branch

General Offices: WATERBURY, CONNECTICUT

U. S. PLASTICS PATENTS

Copies of these patents are available from the U. S. Patent Office, Washington, D. C., at 10 cents each

PHENOL-CELLULOSE RESIN. L. E. Champer and L. M. Christensen (to Chemical Foundation, Inc.). U. S. 2,109,466, March 1. A resin is made by acid condensation of phenol with cellulose at 130-165° C.

RESIN MODIFIER. B. M. Marks (to E. I. du Pont de Nemours and Co.). U. S. 2,109,573, March 1. Plasticizing polyvinyl acetal resin with the benzyl ether of ethyl lactate.

SAFETY GLASS. J. W. Haught (to E. I. du Pont de Nemours and Co.). U. S. 2,109,587, March 1. Safety glass interlayer comprising 100 parts nitrocellulose and 85 parts dibutyl hexahydrophthalate.

CELLULOSE ACETATE PLASTICS. M. L. Macht and A. F. Randolph; M. L. Macht and D. A. Fletcher; M. L. Macht (to E. I. du Pont de Nemours and Co.). U. S. 2,109,592, 2,109,593 and 2,109,594, March 1. Making a homogeneous plastic by a dry grinding operation followed by mastication; compounding cellulose acetate with a blended plasticizer containing 8-38% camphor and 62-92% of a toughening exuding plasticizer; and compounding cellulose acetate with a mixture of 35-45% camphor, 25-37.5% triphenyl phosphate and 25-37.5% of an arylsulphonamide.

METHACRYLATE RESIN. B. M. Marks (to E. I. du Pont de Nemours and Co.). U. S. 2,109,595, March 1. Catalyzing the polymerization of methyl methacrylate with benzoyl peroxide and hydrogen peroxide.

POLYVINYL ALCOHOL. W. O. Herrmann, W. Hachnel and H. Berg (to Chemische Forschungsgesellschaft m. b. H.). U. S. 2,109,883, March 1. Making polyvinyl alcohol by catalytic hydrolysis of a polymerized derivative of vinyl alcohol, in presence of an alcohol.

SHEET MATERIAL. A. M. Collins (to E. I. du Pont de Nemours and Co.). U. S. 2,109,968, March 1. A strong tear-resistant rubber-like sheet material is made by electrodeposition from a dispersion of chloroprene and a salt of a water-soluble alkyd resin.

VINYL RESIN. A. Voss, K. Eisfeld and H. Freudenberger (to I. G. Farbenindustrie Aktiengesellschaft). U. S. 2,109,981, March 1. Emulsion polymerization of a hydrolyzable vinyl ester in a strong aqueous salt solution in which hydrolysis is inhibited so that the product is a polyvinyl ester.

VARNISH RESINS. C. B. Hall, J. D. McBurney and E. H. Nollau (to E. I. du Pont de Nemours and Co.). U. S. 2,110,042, March 1. Tough, flexible resins for varnishes with predetermined drying time are made by extracting an alkyd resin, modified with drying oil acids, to obtain a slow and a fast drying fraction and recombining these fractions in proportions which give the desired result.

COATED FABRIC. Russell Morgan (to E. I. du Pont de Nemours and Co.). U. S. 2,110,070, March 1. A colored enamel finish for rubberized fabric has a vehicle of oil modified alkyd resin.

UREA RESIN. W. Kraus and W. Fisch (to Society of Chemical Industry in Basel). U. S. 2,110,489, March 8. Converting a non-hardenable urea-formaldehyde resin to a hardenable resin by further condensation with formaldehyde.

CELLULOSE ESTER. C. J. Malm and C. R. Fordyce (to Eastman Kodak Co.). U. S. 2,110,886, March 15. A colloided cellulose mixed ester in which at least 20% of the acyl groups are derived from propionic or butyric acid.

LAMINATED CORE. F. E. Henderson (to Western Electric Co.). U. S. 2,110,975, March 15. Impregnating a tubular fibrous web with a phenolic resin, winding with a cellulose derivative and facing with a layer of fiber impregnated with a cellulose derivative, to produce a core for electrical apparatus.

ABRASIVE. N. P. Robie (to Carborundum Co.). U. S. 2,111,006, March 15. A solid binder for abrasive grains comprises a vinyl resin containing sufficient hydroxyl groups to be self-dispersible in water.

DECORATED TUBING. John N. Whitehouse. U. S. 2,111,132, March 15. Forming decorative designs on celluloid tubing by shrinking a hollow openwork (filigree) design cylinder into the celluloid surface.

ABRASIVE SHAPES. E. E. Novotny (to Durite Plastics Div., Stokes and Smith Co.). U. S. 2,111,248, March 15. Coating abrasive grains with a sticky resinous liquid, mixing with a dry reactive resin, cold molding and heating to combine the liquid and solid resins.

DRUM LINING. Wm. F. Waldeck (to Pittsburgh Plate Glass Co.). U. S. 2,111,342, March 15. Metal drums for strong (50%) caustic soda are protected from corrosion by coating the inside wall with a cellulose ether film.

CAN LACQUER. O. J. Hartwick (to Pittsburgh Plate Glass Co.). U. S. 2,111,395, March 15. Inside lacquering of metal beer containers with a blended resin containing a chlorinated diphenyl and an interpolymer of vinyl acetate and vinyl chloride.

PLASTIC. B. Buxbaum (to General Electric Co.). U. S. 2,111,418, March 15. In making plastic articles from a powdered or granular resin the mass is compacted by oscillation at its natural vibration frequency.

LACQUER. W. E. Gloor (to Hercules Powder Co.). U. S. 2,111,446, March 15. A weather-resistant, color-stable lacquer contains cellulose acetobutyrate and a vinyl acetate resin compatible therewith.

GEAR WHEEL. Addison C. Hoof. U. S. 2,111,590, March 22. A gear wheel has a nonmetallic toothed ring molded on a metal hub and rim, with wire mesh attached to the metal rim and embedded in the molded ring.

RESIN CASTING. R. M. Goepp, Jr. (to Atlas Powder Co.). U. S. 2,111,622, March 22. Incorporating sorbitol in a urea-formaldehyde resin casting composition.

RESISTOR. S. Bloomenthal (to Radio Corp. of America). U. S. 2,111,742, March 22. Etching the surface of an insulating base material, coating with a resistance paint containing a polymerizable equivalent of the base material, and baking to bond the paint to the base, for producing resistors.

VARNISH RESIN. C. Ellis (to Ellis-Foster Co.). U. S. 2,111,762, March 22. An alkyd resin which is compatible with cellulose esters is made from diethyleneglycol, oxalic acid and a tung oil : maleic acid addition product.

COLD COLOR PRINTING INK. F. G. Oswald (to John W. Masury and Son). U. S. 2,111,802, March 22. A liquid vehicle for "cold color" printing contains a heat-hardenable resin, ester gum and a chlorinated diphenyl in a drying oil.

INJECTION MOLDING. Harold L. Jeffery (to Grotelite Co.). U. S. 2,111,857, March 22. An improved injection molding machine having its discharge nozzle tapered externally to contract and internally to expand toward its orifice, a heated feed chamber, a substantially unheated mold with internally tapered filling orifice, and means for moving the discharge nozzle and the filling orifice toward each other.

ALKALI-RESISTING RESIN. Herbert Honel (to Helmuth Reichhold, Reichhold Chemicals). U. S. 2,112,022, March 22. A resin with very high resistance to alkali is made by reacting a wax or a neutral varnish ingredient with a phenolic resin made by alkaline condensation of polyalkylated chlorophenols with formaldehyde.

SO WHAT?

Then . . . from 51 different firms, from coast to coast, came letters and inquiries to the Parkwood Co.

from Douglas Aircraft
American Cyanamid
A. G. Spaulding
Hercules Body Works
Ansonia Clock
Wadsworth Watch Case
American Lead Pencil
Sonotone Corp.
Kalamazoo Stationery
Fulton Leather Goods
Knapp Electric Shaver
Autokrat Box Corp.
Crystal Furniture
Fanlamps
National Store Fixture
Travis-Applegate
Universal Ornament and Buckle
Allen B. Wrisley Distributing Co.
Wahl Trunk
S. Karpen and Bros.

and 30 other important firms in a range of 24 varied industries!!

Of course Parkwood had created something unusual.
—BUT ALSO—this story appeared in the premier publication of the youngest and fastest growing industry in the world today—MODERN PLASTICS!!

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That is why MODERN PLASTICS is read so avidly and completely by 9000 leading firms in a wide-spread range of industries!!

And that is why it is the *cornerstone* of so many advertising campaigns of products of vital interest to plastics users and plastics suppliers!!

MODERN PLASTICS

425 FOURTH AVENUE, NEW YORK, N. Y.

NEWS

THE SPRING MEETING OF THE SOCIETY OF THE PLASTICS Industry will be held on Monday and Tuesday, May 23rd and 24th, at Buckwood Inn, Shawnee-on-Delaware, Penna. Officers for the ensuing year will be elected and an elaborate B & G program is planned. Plastic molders, material manufacturers and members of their staffs, whether members of the Society or not, are cordially invited to attend. Reservations should be made immediately in writing to Secretary W. L. Kelly, c/o Chicago Molded Products Corporation, 2145 Walnut Street, Chicago, Ill. Each reservation should be accompanied by a check for \$2.00 to provide nourishment for the plastic "kitty."

PEERLESS MOLDED PLASTICS, INC., A NEW MOLDING COMPANY, was chartered recently in Columbus, Ohio. The incorporators are William G. Skutch, president; Purcell De Han, vice president; and Henry R. Bloch of the law firm of Marshall, Melhorn, Davies, Wall & Bloch. Mr. Skutch is the former general factories manager of the closure division of the Owens-Illinois Glass Co. Mr. De Han was in charge of the plastic molding division of that company.

HERCULES POWDER CO., INC., NOW HAS SIX MATERIALS (five cellulose derivatives and chlorinated rubber) which are being used in the manufacture of protective and decorative coatings. A chart, which directly compares the physical and chemical properties of these six raw materials, is available to make it easy to select the most promising product for a specific purpose.

THE TRAVELING EXHIBITS WHICH DISPLAY THE WINNERS of the Second Modern Plastics Competition are scheduled to appear as follows during the months of May and June: April 23-May 9, Cornell University, College of Engineering, Ithaca, N. Y.; May 19-31, The Rensselaer Polytechnic Institute, Dept. of Chemical Engineering, Troy, N. Y.; May 1-15, Louisiana State University and Agricultural and Mechanical College, University, Louisiana; May 6-20, University of Kansas, Dept. of Mechanical and Industrial Engineering, Lawrence, Kansas; May 11-27, George Washington University, School of Engineering, Washington, D. C.; May 18-30, Massachusetts Institute of Technology, Dept. of Business & Engineering Administration, Cambridge, Mass.; May 1-15, Armour Institute of Technology, Chicago, Ill.; June 1-15, Kaufmann's Dept. Store, Pittsburgh, Pa.; June 1-20, Oklahoma Chamber of Commerce, Oklahoma City, Okla.; June 1-30, Enoch Pratt Free Library, Baltimore, Md.; June 19-30, Kroch's Book Stores, Chicago, Ill. We cordially invite you to visit these exhibits when they are in your neighborhood.

ARTHUR E. WELLS HAS BEEN ELECTED A DIRECTOR AND vice president of the American Cyanamid Company. Mr. Wells is also the chief executive of the Beetle Products Division, of that company.

TENNESSEE EASTMAN CORPORATION'S NEW SAMPLES OF Tenite disks are now available on a chain which can be added to at any time. Over 7,500 colors are made so that the set is merely representative of the different colors obtainable.

THE ANNUAL CONVENTION OF THE TOILET GOODS ASSOCIATION will take place on Tuesday, Wednesday and Thursday, May 24, 25 and 26 at the Biltmore Hotel, New York City.

CELLULOID CORPORATION WISHES US TO CORRECT A RELEASE we published in March, which said the company was dropping the name Protectoid and that in the future the company's transparent packaging material would be known as Lumarith. We have now been asked to state that this material is called Lumarith Protectoid.

INITIAL PLANS HAVE BEEN COMPLETED FOR THE ESTABLISHMENT of a huge technical and commercial information Bureau where executives, engineers, designers, production managers, writers and others may procure without cost technical data and literature on materials, products and processes, as well as technical consultation

service. The Bureau will be located in International Building, New York City, and is being sponsored by Designers for Industry, Inc., through its Chicago, Cleveland and New York offices. An initial ten-thousand drawer filing system is contemplated from which trade literature will be distributed to persons interested. The Bureau will be manned by a corps of consultant specialists representing the eight major divisions of industry.

J. W. MACCABE, FORMERLY WITH GENERAL PLASTICS, INC., is now associated with the Joseph Stokes Rubber Co. of Trenton, N. J., as their sales representative in New York City.

DE VAULCHIER, BLOW & WILMET, INC., INDUSTRIAL DESIGNERS, have moved their offices to 51 East 42nd Street, New York.

GENERAL ELECTRIC COMPANY EMPLOYEES DURING 1937 received nearly \$85,000 for new ideas submitted through the Company's suggestion system. During the year almost 37,000 suggestions were made by workers, and more than 12,000 were adopted. During the past 11 years nearly \$600,000 has been paid out to employees for new ideas adopted for use.

OUR CANADIAN READERS WILL BE GLAD TO LEARN THAT the plant of the Universal Ornament and Buckle Mfg. Co., Ltd., Montreal, has been recently enlarged and is fully equipped with machinery for the fabrication of cellulose nitrate and cast resins for the dress, cloak, hat, fur and handbag trades.

NICHOLAS BALYOZIAN BECOMES CHIEF CHEMIST OF THE Alkyd and Oil Soluble Resin Division of Makalot Corporation. Graduated from Mechanics Art High School, Boston, Mass., in 1912, he won a scholarship for the Massachusetts Institute of Technology and for the remaining three years, due to his outstanding work, he was awarded a free scholarship each year. He graduated in 1916 with a degree of S.B. in Chemistry, specializing in research work.

After graduating from M. I. T. he was employed as a research chemist from 1916-1918 by Charles Pfizer & Company, Pharmaceutical Chemists, Brooklyn, N. Y. From 1918-1920 he was employed as research



chemist by the United Drug Company of Boston. In 1920 he became chief chemist for the John D. Lewis Company of Providence, R. I., where he remained 17 years in charge of research and developments in the manufacture of the Lewisol line of synthetic resins for the paint, varnish, lacquer and other industries.

On March 1, 1938, he became associated with the Makalot Corporation as chief chemist in the Special Resin department which includes the manufacturing of modified phenolics, ester gums, oil solubles, pure phenolics, alkyds, modified alkyds and urea-formaldehyde resins.

No Splash!



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LITTLE COMMOTION
BUT ITS RIPPLES
SPREAD A LONG WAY**

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Nothing spectacular has happened at STOKES!

- No sudden expansion
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Goodness, can it be that we're behind the times?

We think not, tho' our opinion might be prejudiced. Nor do our manufacturer-customers who return to us again and again, well satisfied with the quality and performance of STOKES MOLDED PLASTICS.

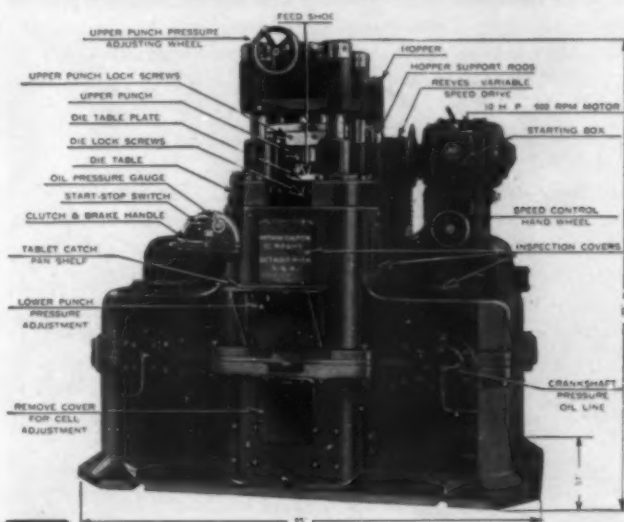
The truth is, our growth has been gradual but healthy. We've suffered no growing pains. We're not beset with an all-consuming overhead. We have a closely knit organization that operates without red-tape. We are fully equipped with time-tested machinery, much of which is in duplicate and triplicate, acquired in an unhurried process. And best of all, we've made it pay—for the benefit of our customers as well as ourselves. *Let's get together!*

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NEWS

APPROVED AND FINAL PLANS FOR THE HOME BUILDING Center of the New York World's Fair 1939, including "The Town of Tomorrow," a far advanced concept of community design and housing, were revealed recently by Grover A. Whalen, president of the Fair Corporation. The Center is to occupy ten acres in the Fair's Shelter Zone and cost approximately \$1,500,000.

The "Town," representing a 5-acre segment designed for a 3,500 population is to feature new architectural treatment and the practical employment of all types of modern house-building materials, methods and equipment, together with suggestions for home furnishing.

WE HAVE RECEIVED AN ANNOUNCEMENT FROM SO-LO Works, that this company is in production, casting small resinous articles in rubber molds. The samples they sent look very interesting and are on display at the offices of MODERN PLASTICS. Inquiries from readers will be sent along to the So-Lo Works if addressed to this company in care of our Readers' Service.

CELLULOID CORPORATION ANNOUNCES THAT THEIR Research Laboratories have recently developed an entirely new series of Lumarith molding materials which reduce considerably the injection molding cycle. They are designated as Lumarith "I" Formula Series. The development of the "I" Formula Series of Lumarith is in step with the rapid progress made in the development of injection molding machines, whereby shots have increased from grams to ounces and projection mold areas have increased to 50 sq. inches or more.

Thus it is claimed that the new molding compound, which is a cellulose acetate material, is faster setting under the same cooling conditions than present materials; has equal or superior flow at the same temperature range as present materials, possesses equal or superior strength of the molded article when compared with present standards.

THOMAS MASON & COMPANY, INJECTION MOLDERS, recently announced the removal of their main office and factory to Melrose Avenue, Stamford, Conn. A New York sales office will be maintained at 11 West 42nd Street.

CASCALOID LIMITED, ABBEY LANE, LEICESTER, ENGLAND, would like to collaborate with responsible American molders and fabricators in the manufacture and sale in England of proprietary items—especially cellulose nitrate and cellulose acetate merchandise thereby avoiding freightage and duties. This company, one of the largest in England, has recently installed injection molding equipment and is also well experienced in the fabrication of celluloid. Catalogs (which may be seen at our editorial office, 425 Fourth Avenue, N. Y. C.) indicate the scope of the company's activities and include such items as Advertising Gifts, Toilet Ware, Table Tennis sets, and all sorts of Dolls and Toys.

THEODOR CARL MÜLLER ANNOUNCES THAT HE HAS opened an office at 3 Pinckney Street, Boston, for the practice of Architecture and Industrial Design, and will divide his time between that office and his New York office at 9 Rockefeller Plaza, New York City.

APPROXIMATELY 1000 PERSONS WERE INTRODUCED TO products of the plastics industry for the first time when they attended a Founder's Day program last month at Lawrence Institute of Technology in Detroit. This number represented the majority of the day's visitors. The display, sponsored by MODERN PLASTICS magazine, took the spotlight away from scores of other exhibitions in connection with college work, according to Robert A. Roggenbuck, student chairman of the day's activities.

CATALIN CORPORATION HAS RETAINED PETER MÜLLER-Munk, assistant professor of Industrial Design at Carnegie Institute of Technology, as consultant and designer for the promotion of Catalin products. Mr. Müller-Munk, who has created many designs in cast resins, will attempt to extend their use in new fields.

THE MANUFACTURE OF THIOKOL HAS BEEN TRANSFERRED from Yardville, N. J., to a new plant erected by the Dow Chemical Co. at Midland, Mich. Thiokol, developed by the Thiokol Corp., is a chemically made rubber which has many unique advantages over the natural product. It has found an expanding market in the petroleum and other industries. Hose made completely or lined with these oil-



Interior of new plant erected by Dow Chemical Co. to manufacture crude synthetic rubber for the Thiokol Corp.

proof rubbers is widely used in handling oil and gasoline. Likewise, makers of paint and lacquer spraying equipment have added to the life and service of their products. Printing benefits by using these synthetic rubbers for ink-carrying rollers, blankets and printing plates.

In automobile, aircraft and various equipment where rubber serves in the presence of oil or gasoline, synthetic rubbers give good service.

When plant expansion recently became necessary it seemed advisable to move the manufacturing activities nearer to the source of raw materials, most of which are made by the Dow Chemical Co., and the new plant is designed to give continuous production of the product by the most advanced manufacturing methods.

The Thiokol Corp. has moved its offices to Trenton, N. J., and will concentrate its efforts on marketing the product and widening the horizon of its usefulness. This company also has established a plant at Trenton in which Thiokol molding powders will be compounded. Dow Chemical Company will manufacture crude Thiokol exclusively for the Thiokol Corporation.

Liquid synthetic rubber is formed by the reaction between ethylene dichloride and sodium polysulphide. The liquid commonly called latex, is then coagulated. The picture shows this coagulated liquid dropping into a filter box where it is washed and dehydrated. In the foreground the latex is being fed into squeeze rolls which eliminate all water





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Ever More Exact . . .

Ever More Durable . . .

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Fine chemicals for plastics

FORMALDEHYDE U. S. P.

of the High Purity and Normal Reactivity
essential in the production of Synthetic Resins

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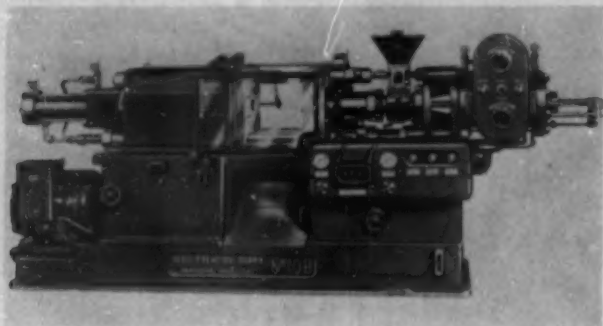
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EQUIPMENT



REED-PRENTICE CORPORATION ANNOUNCES A NEW INJECTION molding press called #10-B, which has a 4 oz. capacity with 24 sq. in. at a maximum pressure of 26,000 lbs., or a 6 oz. capacity with 40 sq. in. at a maximum pressure of 16,000 lbs. Locking pressure of toggle mechanism is 85 tons, weight 12,000 lbs.

The equipment includes a Vickers hydraulic pump with valve control, automatic indicating control pyrometer in addition to the two rheostats for heat control, three nozzles, grease gun and full set of wrenches.

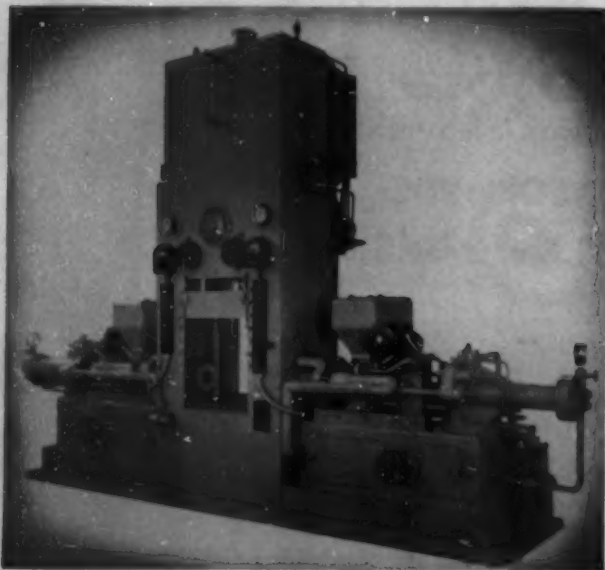
The company is developing larger presses with capacities up to 32 oz. which will be available in the near future.

WITH THE DEMAND FOR LARGER CAPACITY IN INJECTION molding, The Hydraulic Press Manufacturing Co. has recently introduced the Model 100 H-P-M Hydro-Power Injection Molding Press with a clamp pressure of 100 tons—a maximum projected mold cavity 30 to 60 square inches, depending on the shape and type of piece—plasticizing capacity of approximately 80 to 100 lbs. per hour, and operating at two complete cycles per minute.

This new injection molding press which is a basic type for larger capacities to meet specific requirements, consists of a vertical, downward acting mold clamp mounted on a substantial base together with two injection units, one on either side. The capacity of each unit is 8 ozs., or a total of 16 ozs. for the two units. These units are arranged to move toward the mold when it is clamped so that the injection nozzles engage sockets on the parting line of the mold.

The power unit for operating the clamp is mounted overhead on the back of the frame. A surge tank on top holds the operating oil. Auxiliary reservoirs, connected with the surge tank, are provided under each injection unit. Separate power units for each injection unit are mounted on these reservoirs just back of the injection cylinder supports.

A hydraulic ejector is built into the base of the clamp and is controlled manually by a small valve. The clamp portion of the new press is



practically the same as H-P-M Fastraverse Presses ordinarily used for molding thermosetting materials such as phenolics. It may, therefore, be used for this class of molding without change. The injection units are rendered inoperative by simply opening a switch.

This construction, fully covered by pending patent applications, possesses several important advantages: Molds, regardless of size, are easily placed in the machine. There is no side thrust on the platen guides eliminating friction and wear. The closing of the mold is assisted by gravity making possible speed with minimum power. As the clamp ram descends, its suction fills the space in the cylinder above it through a surge check valve. (This is a patented system.) The molds are in the most convenient position for the placing of inserts. Any number of injection units may be used. Therefore, there is no limit to the size of molded pieces for which the machine may be designed.

As the demand for larger molded articles makes necessary ever increasing clamping forces, the advantage of the direct hydraulic clamp becomes increasingly important. The rapid approach and direct hydraulic pressure without links or toggles is a principle that has been in operation on patented H-P-M Fastraverse Presses for over ten years. These presses have been used for various industrial purposes and have been built in sizes from 50 to 5,000 tons. No experimenting or special development is necessary to increase the range of clamping pressure.

MOTO-TOOL, MODEL 2, MADE BY DREMEL MFG. CO. IS AN electric tool for grinding, routing, drilling, polishing and engraving, weighs but 13 oz. and has a molded Bakelite housing and switch control. Tool and die shops have many uses for this handy device and it is a de-



cidedly practical piece of equipment for home workshops. It operates at a speed of about 27,000 R.P.M. and consumes about 60 watts. The motor operates on 110 volts AC or DC. Moto-Tool is small enough to fit the hand and is handled almost as easily as a pencil.

THE DWYER POCKET CO₂ INDICATOR IS CLAIMED TO BE THE first indicator on the market that can be safely carried in your coat pocket, but in spite of the small size of the analyzer, accuracy and ease of operation have not been sacrificed to its compact design. The indicator, complete with carrying case and all accessories, weighs less than three pounds. It is valuable to any boiler room for direct testing of furnace adjustments, and for checking CO₂ recorders for accuracy.

The body of the instrument is made from a cast plastic material which is perfectly clear and colorless, and absolutely unaffected by the caustic solution used in the indicator.

THE CRAMER INTERVAL TIMER IS APPLICABLE TO A WIDE variety of machines, appliances and equipment which are operated on a predetermined time basis. It is driven by a slow-speed, self-starting synchronous motor and is available with normally open, normally closed or double throw contacts.

NOW AVAILABLE IS AN AUTOMATIC, CONTINUOUS WEIGH feeder that provides a steady flow of bulk materials such as coal, dry chemicals and food stuffs by weight per hour to a constant, close accuracy. The machine is made up of a vibratory feeder conveyor discharging onto a constant speed belt conveyor suspended from a scale having sensitive electric valves.

A constant load, by weight, is maintained at all times on the conveyor by the ability of the vibratory feeder to speed up or slow down its dis-

charge as controlled by the electric valves which function on the slightest under-weight or over-weight movement of the scale beam.

A synchronous motor drive insures a constant belt speed. The scale functions purely as a scale, exerting no mechanical power to operate its electric control valves. The feeder is of the pulsating, electromagnet type conveying bulk material by vibration, so it flows like water.

THIS NEW 15 TON, DOWNSTROKE, LIGHT PLASTIC MOLDING press, equipped with automatic electric time cycle and ram control is announced by Greenerd Arbor Press Co. The frame is cast of hydraulic semi-steel and equipped with steel pistons, with 6 piston rings. Ram



is heat treated, ground and packed with chevron type packing. The gland is bled back to the tank, taking care of any seepage, thus insuring dry rams at all times.

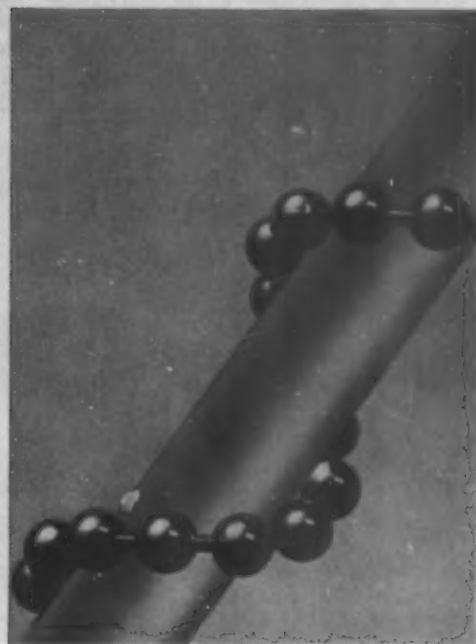
The press is self-contained with control panel mounted on the front with stop—start—jog station, a process timer from 1/2 to 6 minutes, direct reading pressure gauge and emergency stop station.

ILLUSTRATED IS A TAP OF SOLID CARBOLOY CEMENTED CARBIDE for use on plastics and unfired porcelain. Its dimensions are: 1 3/4 in. long by .153 dia., 36 pitch, full vee thread. A similar tap is now in service that has tapped 70,000 holes at the first regrind, with an estimated life of 280,000 holes. Formerly high speed steel taps were used that would give 250 holes per grind and a total of 1,000 holes per tap. The steel tap had to be removed from the machine and reground



every hour and a half or two hours. Experience with these taps has been confined to materials, such as phenolic and urea plastics, unfired porcelain, hard rubber, slate, etc., but further developments may prove them to be applicable on other materials. Made by the Carboloy Co.

INGENUITY



BEAD CHAIN*

BEAD CHAIN* cannot kink nor tangle. It is the perfect answer to any designing problem where a loose part must not be mislaid—where swiveling characteristics are important and appearance is an advantage.



Trade Mark Reg. U. S. Pat. Off.

As a manufacturer you very likely have a product problem that swiveled BEAD CHAIN* may help you solve. Our engineering and design service is prepared to co-operate with you.



STANDARD COUPLINGS AND END ATTACHMENTS FOR MANY NEEDS

THE BEAD CHAIN MANUFACTURING CO.
60 MT. GROVE ST. BRIDGEPORT, CONN.

*Trade Mark Reg. U. S. Pat. Off.

PUBLICATIONS

Booklets reviewed in these columns will be sent without charge to executives who write for them on their company letterheads. Other books will be sent postpaid at the publishers' advertised prices

British Plastics Year Book, 1938

Published by The Plastics Press Ltd., London
Price 15/plus postage and tax

596 pages

The eighth volume of British Plastics Year Book, which deals exclusively with plastic materials and their products, maintains the same general arrangement as in previous years. The "Who's Who" Section, introduced last year, has gained in space as have the sections which include Proprietary Names and Manufactured Products.

The Editorial Section contains a story of the cast phenolic resin development in England written by E. J. Luster of Catalin Ltd. There is a résumé of developments in cellulose acetate by V. E. Yarsley with 125 patent references, and urea-formaldehyde resins are covered.

Section 9 is devoted to data and contains a wealth of tables, gauges and charts of value to engineers and designers working in plastic materials. This volume should be in the office of every technician.

Advertising and Selling through Business Publications

by Mabel Potter Hanford

Published by Harper Bros., New York

Price: \$2.50

Mrs. Hanford has specialized in the purchase of business paper space for Batten, Barton, Durstine & Osborn for the past seven or eight years and this experience has made her a keen judge of those qualities in a business publication which insure an effective advertising job.

The searching analysis to which circulation reports are put today is revealed in the chapter on "Circulation Methods and Audit Bureaus." And the editorial responsibility receives considerable attention in the chapter on "Editorial Standards."

"Advertising and Selling through Business Publications" is a pioneer book in this particular field of advertising effort and publishing. It was planned as a text book of value to publishers, advertisers, and students interested in this type of media and concerned with establishing business paper advertising and publishing on a sound basis.

Modern Rubber Chemistry

by Harry Barron

Chemical Publishing Co. of N. Y., Inc., New York, 1938
Price \$7.50

342 pages

The keynote of this book is sounded by the author when in discussing the use of filling materials in rubber compounding he states, "It is important to remember that commercial considerations outweigh any others." The industrial aspects of rubber chemistry are presented concisely and admirably, with the requisite theoretical background woven into the story in such a manner as to be easily grasped by those who have lacked the opportunity to follow these developments in the original publications. Emphasis is placed on the superior properties of latex rubber articles compared with rubber as normally processed, which is ascribed to the exacting mechanical and heat treatment to which the latter is subjected. The author notes that the trend away from the process of mastication is quite unmistakable, with the most promising development being that of rubber powders suitable for mixing with compounding ingredients and molding by the usual methods employed in the plastics industry.

The twenty-five chapters cover the historical and biological facts concerning rubber, the properties and uses of latex, the compounding and processing of the coagulated product, the determination and the chemical and physical properties of raw and vulcanized rubber, and developments in special products, including reclaimed, hard, and synthetic

rubbers. The arrangement of the chapters and various inaccuracies throughout the book are somewhat disturbing. For example, it is stated that "Thiokol" was brought out in 1932. This reviewer worked with samples of this material in January 1937, and recalls that its actual commercial production in Yardville had begun in 1930. G. M. K.

Specification for Synthetic Resin

Published by British Standards Institution, London
Price 2/2 Postpaid

32 pages

The British Standards Institution has just Published a Specification for Synthetic Resin (Phenolic) Molding Materials and Moldings (B.S.S. No. 771-1938), the first of a series of British Standards in this field. This specification has been prepared as the result of requests received from the British Plastics Federation and other bodies. Prior to its publication B.S.S. 488, Molded Insulating Materials suitable for Accessories for General Electrical Installations, was the only specification which dealt in any way with synthetic resin moldings. That specification, issued in 1933, gives the minimum properties which any molded article must possess when used for the specific purpose of molding electrical accessories.

The new specification is intended to serve an entirely different purpose. It specifies the actual properties of one particular type of molding powder and molding—the phenol-formaldehyde or phenolic type. Several types of commercial phenolic materials have been selected which are in general use for the manufacture of molded articles or component parts and these have been classified according to their properties into five types; Type G (General Type); Type GX (Improved General Type); Type MS (Medium Shock-resistant Type); Type HS (High Shock-resistant Type); Type HR (Heat-resistant Type). Moldings and the materials from which they are made are classified under the same type designations.

BEETLE PRODUCTS DIVISION OF AMERICAN CYANAMID COMPANY has issued an attractive booklet called "In Sight in Mind" which illustrates and describes many uses of Beetle as packaging material for cosmetic containers, jewelry boxes, food containers, closures and accessory packaging. This twelve-page brochure is available to those of our readers who are interested.

AN EIGHT PAGE BULLETIN C-1, PUBLISHED BY THE HAVEG Corporation gives constructional data on all types of reaction, absorption and fractionating towers made by that company. Physical and chemical properties of Haveg are also included.

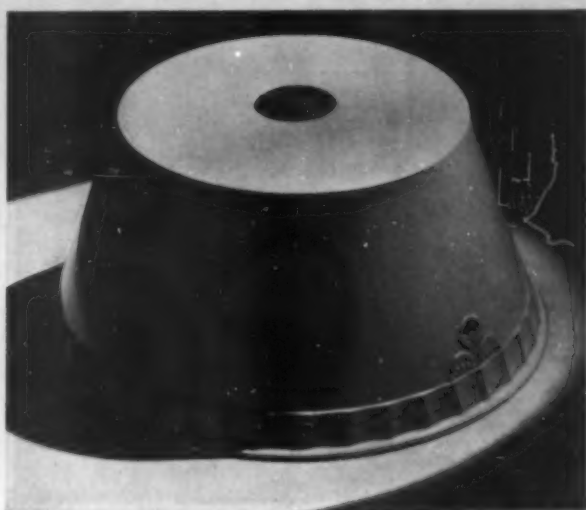
CELLULOSE CORPORATION HAS PUBLISHED A COMPLETE Manual for Lumarith Molding which should be in the hands of every molder. It is intended to facilitate the selection of the proper types of materials to obtain optimum molding results and to explain some of the essential points in the art of molding Lumarith by the compression or injection molding methods.

JOHN W. MASURY & SON HAS RECENTLY PUBLISHED A 12-page booklet describing Masuron, a thermoplastic material, and indicating its application for injection and compression molding. Various grades of the material are listed and proper molding temperatures are indicated for each.

BECAUSE OF RAPID ADVANCES MADE IN THE ART AND science of lighting during the past two years, and to provide a ready source of up-to-the-minute lighting facts for the illuminating engineer, the Westinghouse Lamp Division of the Westinghouse Electric & Manufacturing Company, announces a completely revised edition of its lighting handbook which is available at seventy-five cents a copy.

THE NEW QUARTERLY PRICE LIST HAS JUST BEEN ISSUED BY the R & H Chemicals Division of E. I. du Pont de Nemours & Co., Inc., announcing a reduction in price of Sodium Cyanide, Cyanide Mixtures, Copper and Zinc Cyanide, which became effective April 15th.

"SUPER-SPEED VERTICAL MILLING MACHINES" IS THE TITLE of a new booklet issued by George Gorton Machine Company. Twenty pages illustrate and describe the high precision machines which are designed for die, mold and fine tool room work.



New, multipurpose molded lampshade with high-relief ornament. From skillfully engraved steel dies—yet costing no more than the ordinary kind.

QUALITY unexcelled, exemplifying the experience and facilities behind all Gorham commissions. The studied elegance and refinement in this simple article are obvious.

SPEED of schedule, assured by 24-hour press room runs guarantee prompt, efficient deliveries—regardless of volume.

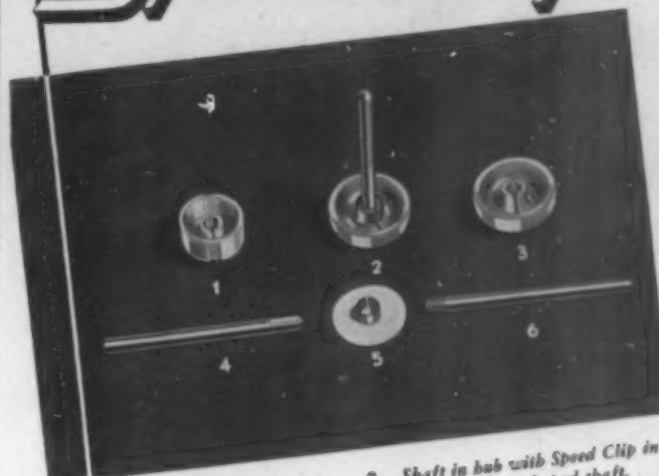
COORDINATION from sketch to finished product—all done under one roof is your surety.

THE GORHAM
CO. *Plastics Division*

PROVIDENCE, RHODE ISLAND
Since 1831

SIMPLIFY WITH

Speed Clips



1. D shaped slotted hub. 2. Shaft in hub with Speed Clip in position. 3. Round slotted hub. 4. D shaped shaft. 5. Speed Clip. 6. Round shaft with knurled end.

AND ELIMINATE INSERTS and WEBBING

● The New Tinnerman SPEED CLIP is adaptable to all types of plastic knob-to-shaft assemblies. It saves the cost of inserts and consequently their handling time. It lowers mold cost by eliminating the use of hub supporting webbing and permits a thinner walled hub.

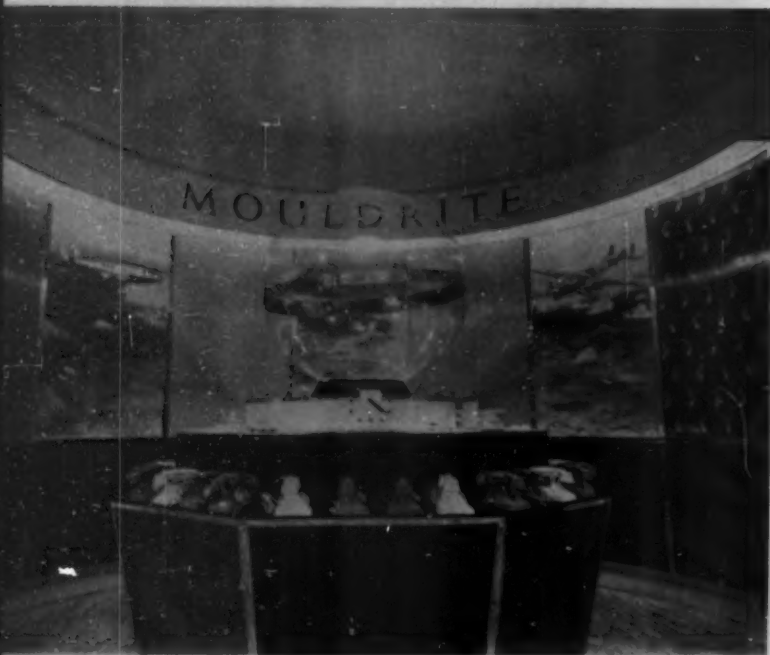
Knobs are held in permanent position by external spring tension pressure around the SLOTTED hub—firmly gripping the shaft end.

Illustration Numbers 1 and 4 show "D" shaped hub and "D" shaped stud for the assembly of knobs requiring turning, such as radio sets. Illustration numbers 3 and 6 show round hole in hub and round shaft with knurled end. This structure resists efforts to remove knob. Excellently adapted to light switch knobs, push button switches and automobile choke controls. Note that hubs are slotted in both cases. No. 5 shows the SPEED CLIP itself which is quickly and economically applied with a special tool furnished.

With thermo plastics having cold flow tendencies, the Tinnerman SPEED CLIP is the only fastening means which overcomes loosening due to this cold flow tendency. . . . Our development engineering department is continually creating new shapes and sizes of SPEED NUTS and CLIPS. Write for samples or turn your assembly problem over to us.

Manufacturers of Patented SPEED NUTS

SPEED NUT DIVISION
TINNERMAN STOVE & RANGE CO.
2048 FULTON ROAD, CLEVELAND, OHIO



BRITISH INDUSTRIES FAIR

IT IS OFTEN REMARKED THAT PLASTICS IN ENGLAND are better known to the man in the streets than they are in the U. S. A. Some will say this is due largely to geographical advantage—that the population of England is more concentrated than it is in the United States.

But that is only half the answer. The real reason lies in the fact that the Plastics Industry in England is organized into efficient units. It makes plans and carries them out along practical lines. It has learned that cooperative action can be made to pay dividends commensurate with expended effort. And it loses no opportunity to take full advantage of this common knowledge to the mutual benefit of those in the industry.

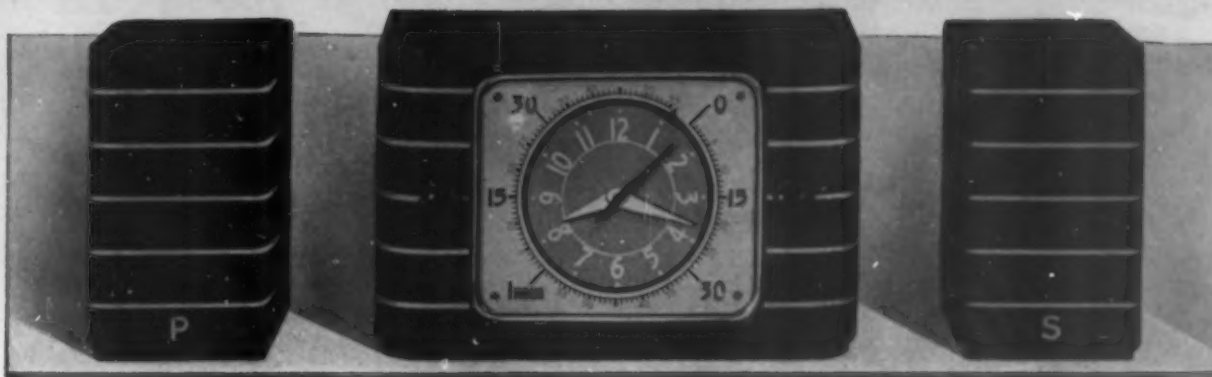
Each year at the British Industries Fair, molders and material manufacturers are represented almost to a man. Elaborate booths are especially designed. Plastic products are dramatically displayed. Individual exhibits are attended by men of experience who can intelligently answer the multitude of inquiries asked by the public which *pays admission* to see the Fair. That's one reason why plastics in England are better known to the man in the streets than they are in the U. S. A.

The Fair is not essentially a plastics exhibition. Both durable goods and consumer goods of every description are well represented. But the point is that the Plastics Industry in Great Britain recognizes the fact that its competition lies not among the plastic molders and the makers of plastic materials, instead, it must compete with all sorts of other materials that have been in use for a longer time and are better known. Therefore to compete successfully, both molders and their material suppliers take their products to the Fair to show the public just what is being done.

Next year the Plastics Industry in America will have an opportunity to take *its* products to the people of the U. S. A. Two mammoth expositions are being planned. If advantage is taken of these opportunities plastics will become better known to the man in the streets over here.

Through the courtesy of G. Norman Higgs, industrial consultant in London, and several of the British concerns exhibiting, we are able to picture three of the stalls from the British Industries Fair of 1938.

YOUR SELECTION - *Make it RIGHT!*



Housing for Electric Minute minder and condiment set for the Lux Clock Company

Who are they?

What is their Reputation?

What is their Financial Standing?

These are but a few questions that you should ask when selecting a molder for ... QUALITY.

It is with this same scrutiny that clients have selected Waterbury Button Company to do their molding.

YOUR SELECTION—MAKE IT RIGHT!

CONSULT
THE WATERBURY BUTTON COMPANY
PLASTICS DIVISION

835 SOUTH MAIN STREET

WATERBURY, CONN.

NEW YORK CITY

BOSTON

PHILADELPHIA

ROCHESTER

DETROIT

CHICAGO

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THEY ARE QUALITY MOLDERS

DU PONT

P.A.C. FORMALDEHYDE
U. S. P. Solution; Water White; Low in Acid;
Low Metal Content

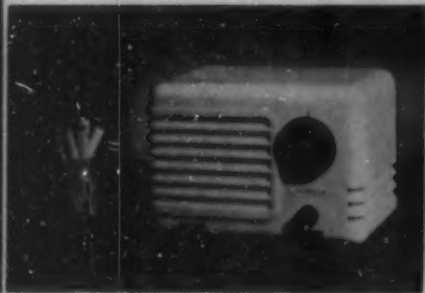
PARAFORMALDEHYDE
95% Minimum Strength
HEXAMETHYLENETETRAMINE
Products of Dependable Uniformity
... Prompt Shipments in
Modern Containers



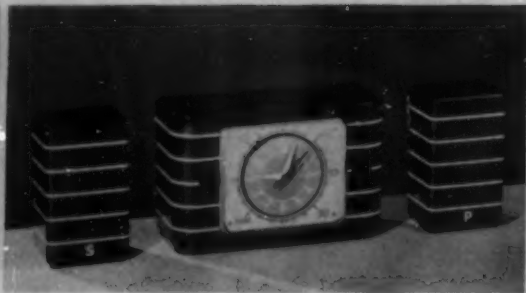
The R. & H. Chemicals Department
E. I. DU PONT DE NEMOURS & COMPANY, INC.
Wilmington, Delaware

District Sales Offices: Baltimore, Boston, Charlotte, Chicago, Cleveland, Kansas City,
Newark, New York, Philadelphia, Pittsburgh, San Francisco

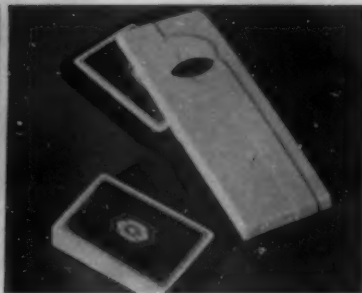
IN REVIEW



1



2



3



4

1. Pee Wee radio, 5 $\frac{1}{4}$ in. wide and 4 $\frac{1}{4}$ in. high, molded of Plaskon and Durez by Chicago Molded Products Corp. for the Detrola Corporation

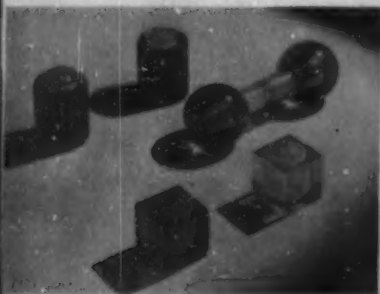
2. Electric minute minder and condiment set molded of Resinox for the

Lux Clock Company by the Waterbury Button Company. For lighter shades, Beetle is used in many colors

3. Permatex plastic cards are appropriately packaged in a Bakelite and Beetle box, which is compact and easy

to keep clean. Molded by Waterbury Button Co. for Bridge Headquarters

4. Payne Lumber Co., Ltd., is using Parkwood, a wood veneer laminated with cellulose acetate, in the production of light weight screens and doors



5



6



7



8

5. Salt and pepper sets of Catalin and Bakelite cast resinoid, distributed by Frederick A. Sernow

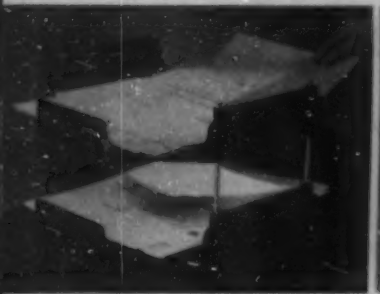
6. Cigaret box in contrasting colors of ethylcellulose, a new plastic by Dow Chemical Company. Injection

molded by Reynolds Molded Plastics Division of the Reynolds Spring Co.

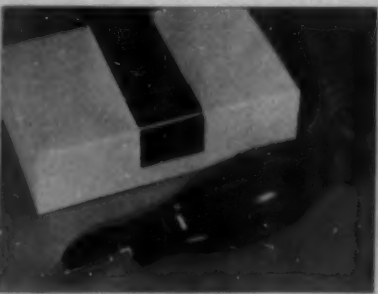
7. Bead chains used for light socket control are usually supplied with a metal pull. The top chain, illustrated, has a molded plastic pull to

provide better insulation. Made by The Bead Chain Manufacturing Co.

8. Injection molded acetate goggle frame with metal insert rims. Molded by Willson Products, Inc., from a mold made by Guy P. Harvey & Son



9



10



11



12

9. Single or multi-tray file is molded of Bakelite by Auburn Button Works, Inc., for Shaw-Walker Co.

10. Zephyr Electric razor with light weight, moisture resisting case

molded of Durez by Diemolding Corporation. Will not crack or chip

11. Invigorator hair brush in crystal clear and translucent green Fiberloid made by Pro-phy-lac-tic Brush Co.

Wide spacing of bristles makes washing or cleaning a simple matter

12. Decorative ring boxes molded of Beetle by Rathbun Molding Corporation for Electric City Box Company



The Clean Buffing Compound

LEAROK has no "free grease" in it. It is clean. It doesn't get into crevices and ornamentations. This, coupled with its excellent buffing properties, make it ideal for finishing plastics. LEAROK can be obtained tinted to match the color of the finished article.

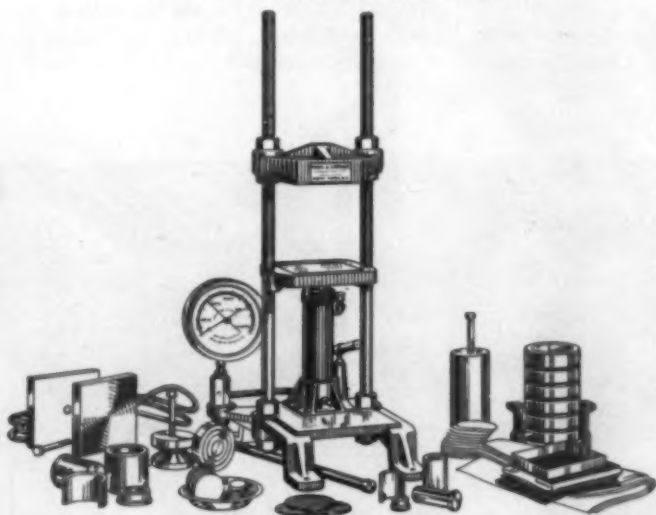
Send a sample of your work for our recommendations.

The Lea Mfg. Co.
Waterbury, Conn.

Canadian Agents: Lea Products Co.
686 Notre Dame St. West, Montreal, Canada

The CARVER LABORATORY PRESS

FOR QUICK, ACCURATE
SMALL-SCALE TESTS
AND GENERAL RESEARCH



Catalog gives details

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HYDRAULIC EQUIPMENT
343 Hudson St. New York

*Precision
Molded*
BY RICHARDSON

INSUROK

EXACTING buyers of molded plastics make Richardson facilities an integral part of their manufacturing equipment, and depend implicitly upon this complete organization as an unfailing source of supply.

Specializing in the volume production of intricate, precision molded parts and products, where constant accuracy and faithful adherence to split thousandth tolerances are commonplace operation, Richardson offers many profitable advantages to industry. Get all the facts. Write for details.

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Melrose Park, (Chicago) Ill. Franklin Park, Ill. Lincoln, (Ill.) Ill.
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IN REVIEW



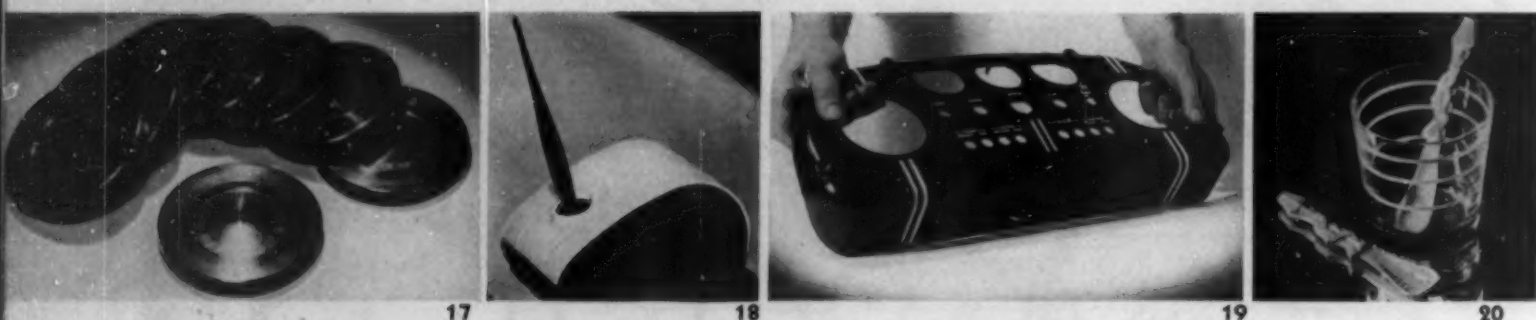
13. Spell-O-Light is a complete automatic switch and light receptacle molded of red Bakelite for Beabes Products Corporation

14. Coronet Vogue, a popular camera molded of Bakelite in England for the

Coronet Camera Company by E. Elliott Ltd. Compact, pocket-size

15. Cast resin drawer pulls accent the dull leather of the new Hartmann Trunk. Barnes & Reinecke, designers, thought this one up!

16. Two-piece bag tops with closing clips are injection molded in jigsaw-pattern of cellulose acetate by E. B. Kingman Company for the Jacmore Company and Alfred-Mayer Weissmann & Company. Holes for sewing to bag are drilled in



17. To resist tangy sea air and to withstand hard knocks, shuffleboard disks are molded of Durez by the Plastic Molding Corporation

18. Sengbusch Handi-pen Desk Set molded of Tenite and Durez in two-

color combinations or in a single color by Chicago Molded Products Corporation. Holds six ounces of ink. A Barnes & Reinecke design

19. Dark gray dashboard panel with white enamel wipe-ins for decoration.

Lighter in weight than the lightest metal panel. Molded of Durez by Ward Plastic & Rubber Co.

20. Decorative Beetle muddlers for mixing drinks. Molded by Diemolding Corporation



21. Fun for young and old, this Brodi game is molded of Bakelite or Plaskon for O. Schoenhut, Inc. It is boxed with a supply of plastic chips

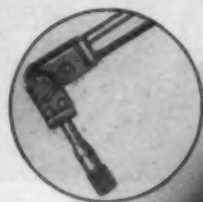
22. Chip rack of Bakelite cast resinoid. Holds 100 cast resin chips in

assorted colors and a deck of cards. Made for Twin-Glo Products Co.

23. Plastic lighters with hooded wick for wind protection. Molded of Durez and Beetle by Rathbun Molding Corporation for Helios Lighter Company

24. Dust-proof Bakelite molded case used by S. W. Allen Co. for their Plus-adding calculator. Said to be the fastest key-drive calculator on the market. Molded housing is only 4 inches high, 8 3/4 inches wide and 6 inches deep. Total weight 5 1/4 lbs.

**THE ONLY SELF-ALIGNING
THERMOCOUPLE**
(Patent Pending)
is used with the
"ALNOR" PORTABLE PYROCON



Truly accurate readings of mold and platen temperatures cannot be assured when the readings depend on the skill of a hurried worker in placing the thermocouple in alignment with the mold. The "ALNOR" Pyrocon thermocouple is self-aligning—it excludes the cooling air—insures high accuracy under the most difficult operating conditions.

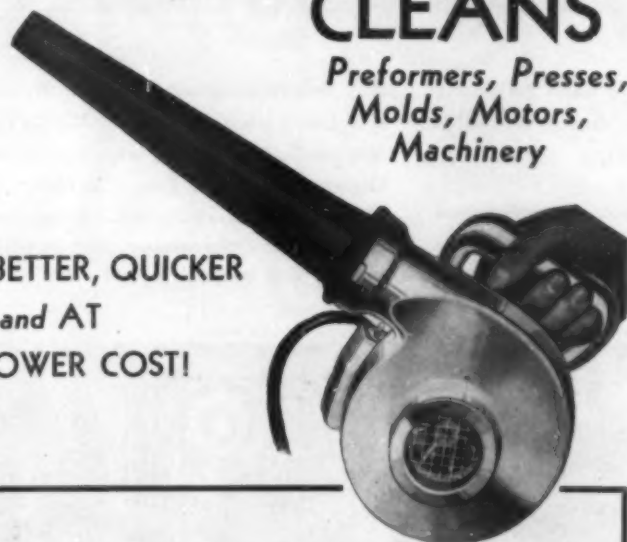
Write for full details regarding the moderately priced "ALNOR" Pyrometer with this improved self-aligning tip.

ILLINOIS TESTING LABORATORIES, Inc.
428 N. La Salle St. Chicago, Ill.

CLEANS

*Preformers, Presses,
Molds, Motors,
Machinery*

**BETTER, QUICKER
and AT
LOWER COST!**



The Clements-Cadillac Portable Blower and Suction Cleaner has won a place for itself in the plastics industry. It is recognized as the handiest, safest and most economical method of cleaning motors, machinery, stock bins, etc. Converts instantly into a Sprayer. Plugs into any light socket!

*Consult your local jobber or
write for free trial offer!*

CLEMENTS MFG. CO.
6653 So. Narragansett CHICAGO, ILL.

Molders of BAKELITE PLASKON BEETLE

and similar compounds . . . for the electrical, automotive, and radio fields.

Modern, fully equipped plant with an efficient, experienced staff to meet demands of exacting nature.

We invite inquiries on your molded requirements.

EUREKA BUTTON CO.

Molded Plastics Division

892 Broadway

New York City

Leadership in Methods as well as Product

During the past 20 years, Claremont has grown to leadership in its branch of the industry, producing finer, more uniform and cleaner cotton flocks than was obtainable elsewhere.

But—although our clients were satisfied with our product—our desire to make still better flocks prompted us to plan and develop radically different machines to assure greater production and finer product.

These machines are exclusive with Claremont. The method is thus exclusive and the accompanying quality too.

**Place your problems before
CLAREMONT. No obligation.**

CLAREMONT WASTE MFG. CO.
CLAREMONT NEW HAMPSHIRE
THE COUNTRY'S LEADING
MAKERS OF COTTON FLOCKS

IN REVIEW



25

25. Magnetic circuit breaker molded of Bakelite by Kuhn & Jacob Moulding & Tool Company for Heinemann Electric Company



26

26. D. R. Slater has perfected a comfortable foot corrector by using four-



27

ply cloth Bakelite laminated and a phenolic resinoid cement to seal the various supports



28

three inches overall. Molded of Durez by Norton Laboratories, Inc., for Micro-Lite Company

27. Pull the trigger and you have a flash of light darting from the muzzle of this novelty gun. Housing measures

28. Small, convenient vacuum hat brush of Beetle by Molded Insulation Co. Available in a variety of colors



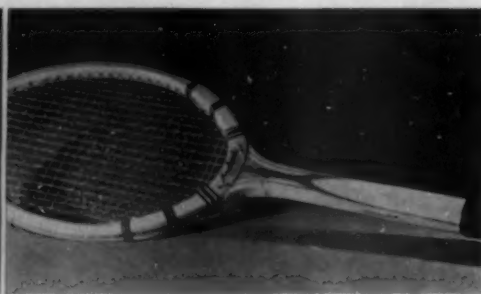
29

29. Catalin buttons by Helmer Import and Novelty Co., are inspired by Mother Goose rhymes to delight the children. Cards are printed with the various poems and two buttons in appropriate shapes are attached at the top and bottom



30

30. Plaskon is being used to house this Gilfallen radio. Harry W. Hahn Mfg. Co. did the molding



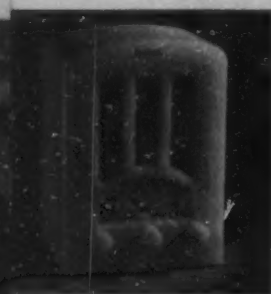
31

31. Duracket has been strenghtened by a Bakelite laminated strip positioned in a channel around the frame



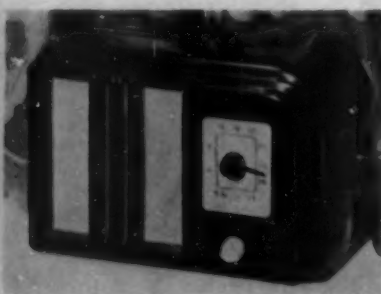
32

32. Ash receiver with chromium bowl and black phenolic base. Molded by Norton Laboratories, Inc., for Revere Copper & Brass, Inc. Dividing the chromium globe into two hemispheres is a brass and chromium ring on which is mounted several copper stars



33

33. Fiberlon radio cabinet cast in six colors for Emerson Radio & Phonograph Company by Monsanto Chemical Company, Fiberloid Division



34

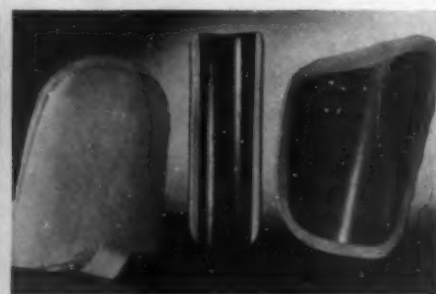
34. Gorham Company molds the Durez housing of this Dunlop radio



35

which is 5 1/4 inches by 4 1/4 inches. The white dial has bronzed numerals

35. Developing tank adjustable to all sizes of roll film from a full six-foot 35 mm. roll up to and including size 116. Molded by Boonton Molding



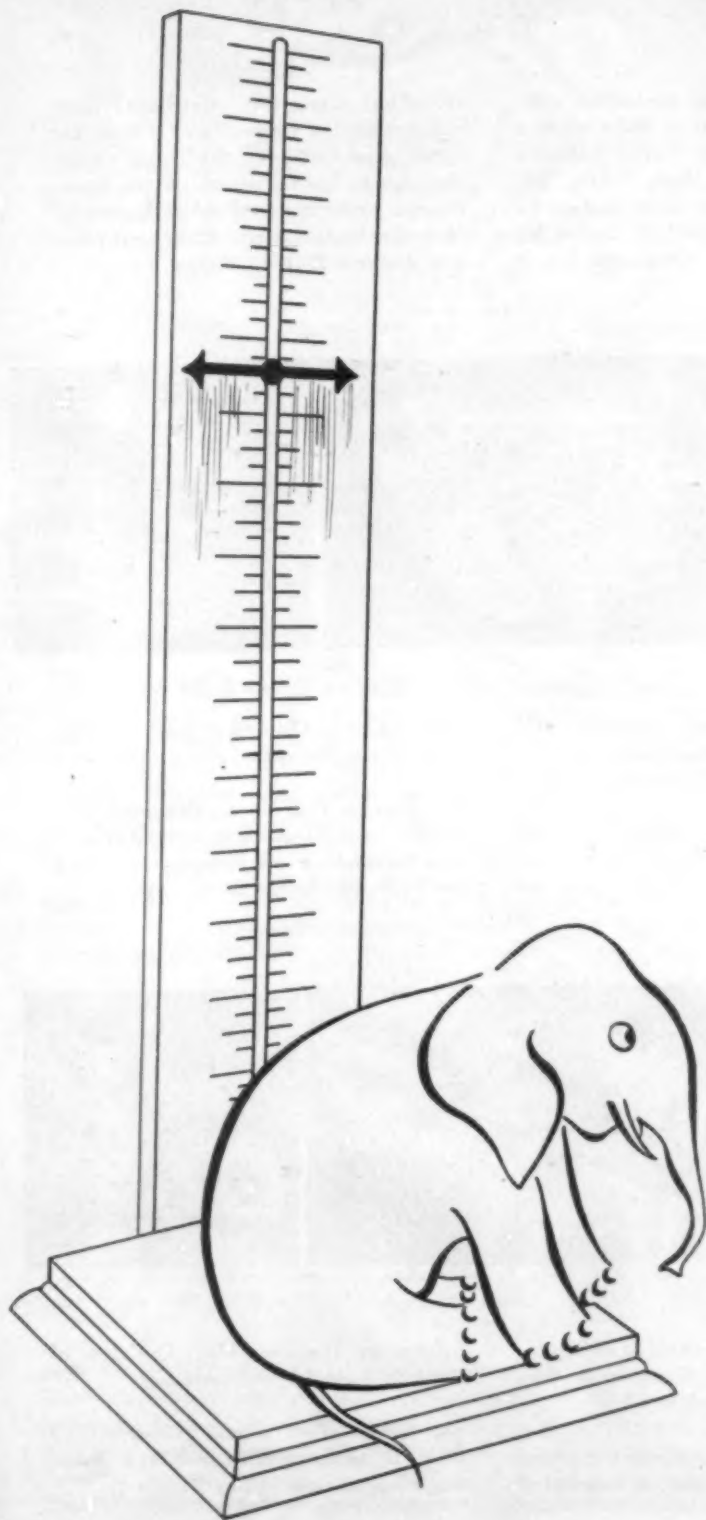
36

Company of Bakelite for Fink-Rose-lieve Company, Inc. Tank is resistant to photo chemicals

36. Shin and thigh guard of canvas impregnated with Bakelite resinoid varnish. Made for A. G. Spaulding & Bros.

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69

IN REVIEW



37



38



39



40

37. Hood knob and brake handle ball of molded Bakelite are used on F. A. Whitney baby carriages

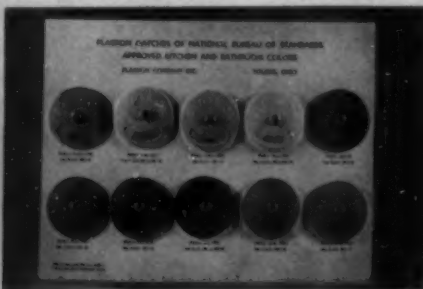
38. Western Union advertising display in which translucent laminated Beetle is used for the luminous panels

39. Advertising desk accessory with removable metal name plate at the top is announced by Alfred Robbins Organization. The box holds 250 loose sheets of paper four inches by seven inches. Molded of Durez by Northern Industrial Chemical Co.

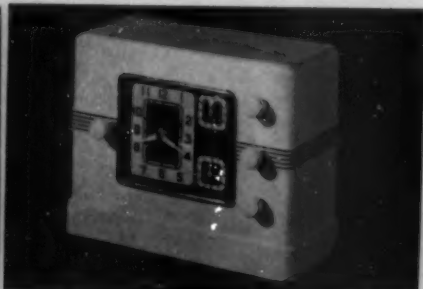
40. The Chereton Cordless Iron eliminates the necessity of a cord for direct attachment to the iron through the use of heat control in the base. Plastic parts are molded of Durez by Midwest Molding and Mfg. Company and Auburn Button Works, Inc.



41



42



43



44

41. A recently designed memo pad box with four rubber feet on the base to prevent slipping. Molded of Bakelite by Gorham Co. for Autopoint Co.

42. Plaskon Company, Inc., sample cards of molded urea disks showing

the twelve approved kitchen and bathroom colors established by the National Retail Dry Goods Association

43. Westinghouse range timer manufactured by the Lux Clock Company. Has an attractive, easy to

clean housing molded of Beetle by the Watertown Manufacturing Company

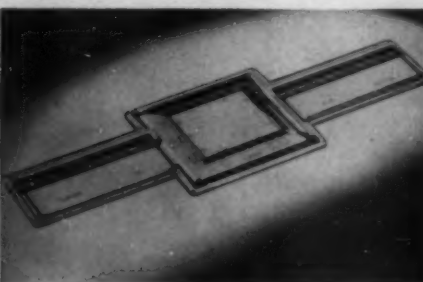
44. Harold Van Doren designed this smart, new Plaskon thermostat and it is molded by the Remler Company for D. H. McCorkle Company



45



46



47



48

45. Philco Radio for the first time has chosen a plastic radio cabinet, which is molded by Associated Attleboro Manufacturers, Inc., and Northern Industrial Chemical Company of urea and phenolic

46. Exposure meter molded of Textolite by the Plastics Division of the General Electric Company

47. A transparent instrument panel for the 1938 Studebaker, is molded of

Lucite by the Bay Mfg. Division of Electric Auto Light Company

48. Roll-O-Pod tripod imported by D. F. Lowenberg is housed in a Bakelite molded case 3 1/2 by 1 inch



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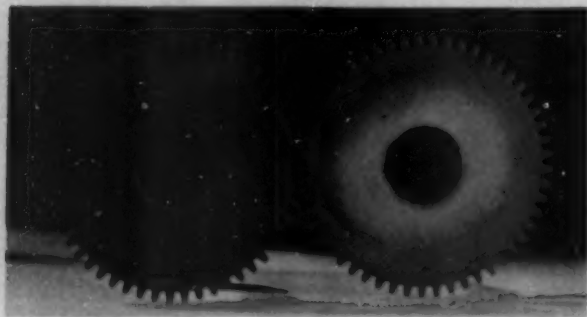
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FIVE YEARS OLD

After a five year service test in a conventional hermetically sealed household refrigerating unit, the Micarta non-metallic gear showed no apparent wear. Although slightly discolored from its continual bath of oil and refrigerant, the surface was clean and firm and there was no evidence of swelling, distortion or wear of teeth.

The advent of household refrigeration carried with it the development of new materials of construction, including organic insulation and non-metallic mechanical



equipment. In hermetically sealed units all materials were required to operate at slightly elevated temperatures in oil and refrigerants or an atmosphere of both. Oil was well known, but very little operating data was available on the refrigerants which included ammonia, sulphur dioxide, and halogenated hydrocarbons (F-11, F-12, F-21, F-114, Carrene, Methyl Chloride, etc.). These materials are excellent solvents and difficult to resist. Organic insulating materials such as cellulose or wood appeared to stand up, but gave off water causing corrosion, and materials such as varnish for coil impregnation or enamels, etc., were generally too soluble. Preliminary trials resulted in the use of a laminated phenol resinoid bonded material, which when tested under accelerated service conditions at abnormally elevated temperatures and over a wide range of vapor and liquid concentrations met all requirements.

MOLDS FOR PHENOL RESINOIDS

(Continued from page 45) in these inserts are usually below $\frac{1}{4}$ inch diameter, this retapping results in a poor threading job and is highly undesirable for Navy work.

Where insert holding pins have a threaded spindle for holding the inserts, these pins, of necessity, cannot be permanently secured to the plates, as this would prevent their removal after the molding operation.

Hole forming pins

(Parallel to direction of train of force plug)

These hole forming pins are of the same category as insert holding pins in direction parallel to the direction of train of the force plug.

These pins when of $\frac{1}{4}$ inch diameter or less should not extend through the molded piece to the top force, but should be terminated flush (minus 0.005 inch) with the

surface of the top force when in its final closed position. Larger pins may extend through, if desired.

The diameter of these pins used with C. F. I. (cellulose filler, best impact strength) should be not less than $\frac{3}{16}$ inch diameter. For C. F. G. (cellulose filler, best general use) the minimum diameter of pin may be $\frac{1}{8}$ inch.

Insert holding pins for C. F. I.

(90 degrees from direction of force plug)

Side insert holding pins must be held securely in the mold by threads or lockrings and they must be so assembled in the mold that they may be readily removed in order that the molded piece may be ejected from the cavity. The minimum diameter of these pins should be $\frac{1}{2}$ inch.

These pins should be positioned so that there will be a clearance between the inner face of the insert and the train of the force plug in order to preclude the possibility of the force plug striking these inserts during the molding operation.

Hole forming pins

(90 degrees from direction of force plug)

These hole forming pins are of the same category as the insert holding pins in direction 90 degrees from the direction of travel of the force plug.

These pins should be positioned in the manner described for insert pins so far as concerns clearance between the end of these pins and the travel of the force plug.

Knockout mechanism

Hand molds, other than those types having stripper plates, are parted and the pieces ejected by means of suitable knockout plates. Semi-automatic molds and stripper plate molds have their knockout mechanism formed as an integral part of the mold assembly.

Knockout plate should be of steel as specified for the force plate and the knockout pins should be of the same material as the guide pins. Automatic ejection mechanism parts should be steel in all cases, and of a degree of hardness best suited to the particular design and piece.

The thickness of knockout plates should be not less than $\frac{1}{2}$ inch, and the knockout pins should be shouldered and flush riveted to these plates.

All knockout plates, tools and mechanisms should be considered as parts of the mold itself for Government purchase and should be delivered with it.

Hand molds should always be opened and the pieces ejected by means of the knockout plates supplied with the mold. The mold should not be hammered, dropped or bounced to accomplish the ejecting of the pieces.

Inserts

Provision should be made for the retention of inserts in the mold in such a way that their exact alignment and correct spacing is preserved in the finished part.

It has been found more economical in the molding industry to use inserts of the closed end type, than to use the cheaper type of insert having through tap. With

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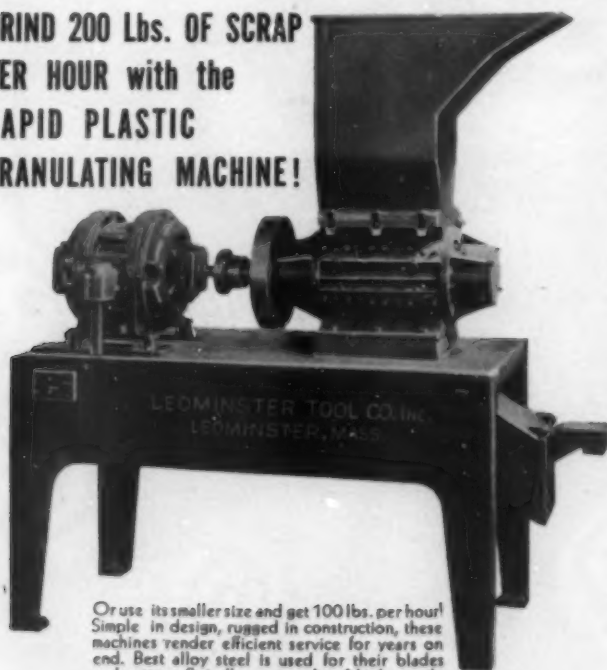


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open end inserts, the material will flow around the threads necessitating a cleaning operation that must be done with a tap. This retapping operation cuts away or enlarges the threads making a loose fit with the machine screw which is undesirable. It is more economical to tap on an automatic screw machine than tap by hand. All Navy design inserts are now of the closed end type wherever it is found to be practicable.

Spacer fork

The use of the spacer fork is previously described under the Flash Filler Plate Mold. This fork should be of machine steel and need not be hardened.

FISH STORY

(Continued from page 27) the water; a second causes it to skip; a third produces a zigzag motion; with a fourth the lure trolls straight on the surface; and a fifth is used for trolling under the surface. The diving lure has a lead weight directly behind the cast resin head.

The heads are furnished in red and white, which are generally conceded to be attractive to fish, and also in pale blue—a color so we are told, that has never before been used for salt water fishing. Although most of the old-timers scoffed at the idea of a blue lure, Captain De-Waal and his associates found that it raised more fish than either of the other colors.

A far cry from Walton's silk minnows are the modern versions for fresh and salt water sport molded from opaque white cellulose acetate and lacquered in colors to resemble the tiny fish, eyes and all. Until something over a year ago, these were made of wood which was an uncertain material and hard to balance properly; consequently their action in the water was not uniform as is the action of plastic lures.

Catching a string of fish with one minnow sounds a bit *Robert Ripley-ish*, but a lure has been designed that makes it possible to do just that. It's a two-piece transparent cellulose shell big enough for a live minnow to squirm around in comfortably. Water passes back and forth through small holes in the side keeping the minnow alive and active and if it doesn't die of fright when a big fellow swallows the lure, it stands a chance of being released at the end of the day. And what tall tales it must have to tell its pals on the home grounds! Though if it's a good minnow the thrifty fisherman may simply transfer it to a pail of water to work for him another day. Little sheets of colored paper with holes to coincide with those in the lure are often inserted.

Reels and rods are as carefully selected by fishermen as are lures, and plastics are used on many of these for better appearance and longer service. There are reels with transparent cellulose ends—the curious can see what makes it go without taking it apart—and handles. A new egg-shaped cast resin reel handle introduced at Miami this season, larger than the usual type, is said to be easier to handle with a big fish in tow because it can be gripped in the palm of the hand. Cellulose acetate



The Bal Cli, direct drive level winding reel with Lumarith head ring, from Kalamazoo Tackle Co., division of Shakespeare Co. South Bend Co. packages Dry Pork Rind in a transparent Lumarith box

reel seats add color to fish rods and are pleasant to the touch. They do not corrode.

With all these gadgets, a fisherman's outfit can be an expensive collection of accessories or it can be as simple as the one used by a fellow we know who spends his vacations fishing in Maine. Give him a reel, a rod, a light line, a minnow and a pin bent just so, and off he goes after small mouth bass. It takes time and clever angling to land a bass on a pin—it's too easy for the fish to spit out the bait at the first prick. But that's one man's idea of sport and if the day is long enough and the fish hungry, he usually manages to haul in plenty for a meal which he cooks over an open fire on shore.

Deep sea fishing demands this torpedo-type reel grip. Injection molded of Tenite for Ocean City Mfg. Company by Erie Resistor Corp.



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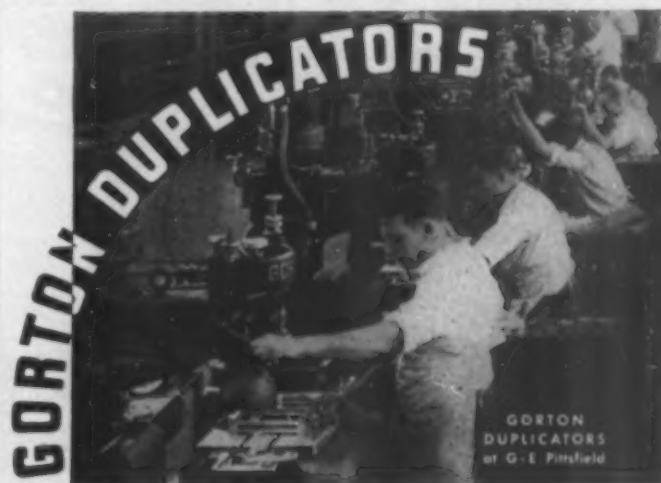
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PERMANENCE OF PLASTICS

(Continued from page 46)

Grade	Yield Temperature °C.
O	300
I	200
II	140
III	100
IV	70
V	55
VI	Not specified

In general, synthetic resin moldings fall into Grades II and III, loaded hard-rubbers into Grade IV and non-loaded hard-rubbers into Grade V.

The classification system used in Germany involves not only temperature grading but also cross-breaking

strength. In the temperature test (Martens) a rectangular bar is subjected to a bending stress of 50 kg. per sq. cm. of cross sectional area. The bar is clamped at one end, in a vertical position, and the bending force is applied at the other end. The temperature is raised at a rate of approximately 50 degrees C. per hour until the deflection of the beam reaches 6 mm. Owens³ criticizes this method as misleading for the determination of data of value for practical designing because it does not take into consideration the time factor. The deformation temperatures are generally higher by this method than by the British test. Minimum values are also specified in the German system for a number of secondary factors such as impact strength, surface resistance after immersion and fire-resistance. The complete German classification for the non-ceramic rubber-free insulating materials is shown in Table 2. (Please turn the next page)

³ W. D. Owens, "The Classification of Industrial Plastics," British Plastics 7, 552-4 (May 1936).

FIGURE 4.—CONDITION OF VARIOUS PLASTICS AFTER EXPOSURE TO CARBON-ARC LIGHT FOR 500 HOURS

Identification number	Material	Sample			
1	Cellulose acetate	A1	7	Ethylcellulose	H1
2	Do	B3	8	Do	I1
3	Do	C1	9	Methyl methacrylate resin	J1
4	Do	D1	10	Do	J2
5	Cellulose nitrate	E1	11	Do	K1
6	Do	F1	12	Do	K2
			13	Vinyl chloride-acetate resin	L1
			14	Vinyl acetal resin	M1
			15	Cellulose acetobutyrate	S1
			16	Glyceryl-phthalate resin	O1



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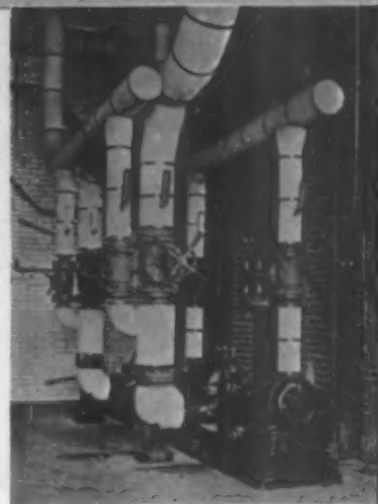
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TABLE 2.—CLASSIFICATION OF NON-CERAMIC RUBBER-FREE INSULATING MATERIALS IN GERMANY

V.D.E. designation	Heat resistance (Martens) °C	Properties (minimum values)				Fire resistance ^a	Surface resistance after 24 hrs. in water megohms	Composition
		Flexural strength kg./cm. ²	Impact strength of unnotched specimen cmkg./cm. ²	Impact strength of notched specimen cmkg./cm. ²				
Y	400	1,000	5.0	..	5	10,000	Hot molded lead borate-mica	
X	250	150	1.5	..	5	...	Cold molded cement or sodium silicate with asbestos or other inorganic filler	
M	150	700	15.0	15.0	4	100	Hot molded phenolic resin with spun inorganic filler, e.g., asbestos cord	
I ₁	150	500	3.5	2.0	4	100	Hot molded phenolic resin with fibrous inorganic filler, e.g., asbestos fiber	
I ₂	150	500	3.5	1.0	4	100	Hot molded phenolic resin with granular inorganic filler, e.g., powdered stone	
2	150	350	2.0	..	4	100	Cold molded synthetic resin with asbestos and other inorganic filler	
3	150	200	1.7	..	4	100	Same as above	
4	150	150	1.2	..	4	100	Cold molded natural or artificial bitumens with asbestos and other inorganic filler	
Z ₁	125	1,200	15.0	10.0	3	100	Hot molded phenolic resin with laminated paper filler	
Z ₂	125	800	8.0	5.5	3	100	Hot molded phenolic resin with shredded paper filler	
Z ₃	125	600	5.0	3.5	3	100	Hot molded phenolic resin with short fiber cellulose filler	
T ₁	125	800	25.0	..	2	100	Hot molded phenolic resin with laminated fabric filler	
T ₂	125	600	12.0	12.0	2	100	Hot molded phenolic resin with shredded fabric filler	
T ₃	125	600	6.0	6.0	2	100	Hot molded phenolic resin with short fiber textile filler	
S	125	700	6.0	1.5	3	100	Hot molded phenolic resin with wood flour filler	
O	100	600	5.0	2.0	2	100	Same as above	
K	100	600	5.0	1.2	3	10,000	Hot molded urea resin with organic filler	
6	65	350	3.5	..	2	100	Hot molded natural resins, natural or artificial bitumens with inorganic filler	
7	65	250	1.5	..	1	100	Same as above	
8	45	150	1.0	..	3	10,000	Hot molded natural or artificial bitumens with inorganic fillers	
A	40	300	15.0	..	1	100	Hot molded cellulose acetate with or without filler	

^a An arbitrary grading of fire resistance is accomplished by a test in which the specimen is kept in contact for 3 minutes with a rod heated to 950° C, the loss in weight (in mg.) and the extent of the burning (in cm.) of the specimen are measured, and the product of the two figures is calculated. The various grades are as follows:

Product (mg. × cm.)	Fire resistance grade
Over 100,000	0
100,000 to 10,000	1
10,000 to 1,000	2
1,000 to 100	3
100 to 10	4
Under 10	5

Grade 0 indicates complete combustion; grade 5 indicates an incombustible material.

TABLE 3.—STANDARD HEAT STABILITY TESTS

Country	Method	Size of specimen	Method of loading	Temperature conditions	Observation
England	B.S.S. No. 488	15 × 15 × 200 mm.	Horizontal bar with 450 g. load 5 mm. from one end	Temperature kept constant for 6 hr.	Temperature at which deflection is 5 mm. at the end of 6 hr.
Germany	V.D.E. 0302	10 × 15 × 120 mm.	Vertical bar loaded to a stress of 50 kg./cm. ²	Temperature raised at rate of 50°C per hr.	Temperature at which deflection is 6 mm.
United States	A.S.T.M. D 48-33	12.7 × 12.7 × 127 mm. (0.5 × 0.5 × 5 in.)	Horizontal bar on supports 102 mm. (4 in.) apart with 2.5 kg. (5.5 lb.) load at the center	Temperature raised at rate of approximately 1°C per 2 min.	Temperature at which deflection is 0.254 mm. (10 mils.)

No organized effort has been made in this country to classify plastics on the basis of their behavior at various temperatures. However, a method for the determination of distortion under heat has been adopted by the A. S.

T. M. A comparison of this method with the German and British procedures is shown in Table 3. It will be noted that the A. S. T. M. method is similar to that used in Germany insofar as the neglect of the time factor is

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concerned. Some data on the time factor in the cold flow of plastic insulating materials were recently obtained by Burns and Hopkins⁷ in the Bell Telephone Laboratories. The change in percent in the height of the specimen in 24 hours at 120° F. with a load of 1000 lbs. is taken as the cold flow value of the material. Typical values obtained are presented in Table 4. The authors state that this test has proved quite satisfactory in predicting service behavior of insulators.

TABLE 4.—TYPICAL VALUES FOR COLD FLOW OF PLASTICS AS MEASURED BY BELL TELEPHONE LABORATORIES

Material	Cold Flow percent
Ebony asbestos	0.2
Phenol plastics	0.4
Urea plastics	0.4 to 7
Hard rubber	0.5 to 80 ^a
Vinyl plastics	1.0 to 32
Cellulose acetate plastics	2.0 to 64
Polystyrol	2.0 to 22
Acrylic resins	1.0 to 50
Cast phenolics	10.0
Benzylcellulose	76.0

^a Good commercial hard rubbers have a cold flow of 5 percent or less.

The previously described tests for stability of plastics at elevated temperature have reference entirely to deformation of the material. The effect of continuous operation at elevated temperatures on other properties, such as appearance, strength and composition, must also be included in any study of the permanence of plastics. There is relatively little information available on the properties of plastics at other than normal temperatures and still less on the effect of continuous exposure at high temperatures on these properties. This is a field in which the Permanence Subcommittee will in the course of its work supply data which should be very useful to engineers and designers of equipment.

⁷ R. Burns and I. L. Hopkins, Cold Flow of Insulating Materials, *Modern Plastics* 14, 49 (August 1937).

(To be concluded in our June issue)

INDIRECT HIGHWAY LIGHTING

(Continued from page 29) makes available for the first time dimensional accuracy for reflectors far beyond the possibilities of pressed glass. Stimson had this new plastic to work with experimentally long before its commercial availability, through the cooperation of the du Pont research laboratories. Accordingly, he has been refining his molds to greater and greater degrees of precision, so that the tiny cubes of his reflector could reflect the light falling on them back toward the car with such great brilliance that indirect highway lighting would become possible. After five years of development, the divergence angle has been cut down to about two degrees, and this probably represents about the practical limit of perfectability. To cut down the divergence angle much more would return the light so close to the headlight that the driver of the car would not see it (Fig. 4).

These molds are made with far greater precision than has ever been used before in fabricating any of the

conventional pressed plastic products. The inventor has established a development laboratory and a small manufacturing plant where all the manufacturing processes remain under his personal supervision. In this way, he is assured of a degree of accuracy in the finished product consistent with the precision of the perfected molds. The work in this plant is strictly limited to production, development and research on retro-directive reflectors.

METAL INLAYS THAT STAY PUT

(Continued from page 31) is slightly convex on the back and is supported by a piece of base metal which is harder than the inlay itself. When pressure is applied to the top, the base metal causes the inlay to spread out on all sides penetrating through the plastic walls of the recession, permanently locking it into place. (See Fig. 1.) The harder the plastic used, the more difficult it is to wedge the inlay into place and the more permanent it becomes.

This type of metal inlay is not especially expensive although much of the operation is hand work. Of course, a die is required for stamping the metal letters and designs. From there on, it is simply a matter of cutting grooves in the surface to take the inlays, or where the grooves are molded in, it is simply an assembly and pressing operation. In gold inlays, $\frac{1}{2}$ th of the thickness is 14-carat gold with wearing qualities equal to a 25-year watch case and even though the material may sound expensive if quoted in pounds, the individual pieces are so light in weight that they are not costly.

Inlays may protrude a bit or may be flush with the surface as desired. They can go around corners without a break. Flat bands of varying widths may be inlaid in any direction or delicately stamped metal designs can be placed at will. About the only remaining limitation at present is that letters have rounded ends instead of square because grooves are cut with a rapidly turning diamond drill which leaves the groove-end round. Molded grooves can have square ends.

But once they are in, they are in to stay. A strip of cellulose acetate or cellulose nitrate with a line of letters may be flexed into a complete circle without disturbing the inlaid letters. It can be bent and rebent but they won't come out.

Possible applications that bob into mind are numerals for clock faces and instrument panels, typewriter keys, adding machine keys, markings on scientific instruments to be used outdoors, advertising novelties, premiums, cosmetic jars (letters and designs can be inlaid around the top of any closure or cap), packaging of all sorts where a reuse container is desired, and almost every type of identifying sign from a permanent label on a business machine to directional signs in business buildings. Inlays on translucent plastics provide definite opaque markings when the signs are lighted from behind.

The company maintains a laboratory for close cooperation with designers where hand-made samples can be turned out to show just how the inlay will appear.